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Original Articles.

WOUNDS OF THE JOINTS.

By L. Eloesser, M.D., San Francisco.

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The mass of material that has accumulated during the present war has served to change many of our notions as to the treatment of injuries to the joints.

The difficulties of treatment are largely mechanical and due to the complex anatomy. We speak of *a* joint cavity; more accurately, each joint is a series of cavities with more or less open communication—a series of cavities with many interdependent pouches and pockets. Even the main cavity of a joint is not an entirely free space; in hinged joints it is divided by the bones and the intra-articular ligaments into two or more or less independent front and rear parts. The cavities are lined by a single layer of flat cells, which secrete a slimy synovia and are differentiated from connective tissue by the demands of use. Under the synovial layer lies an intricate network of lymph spaces, which, however, seems to have no direct connection with the joint cavity. As long as the synovial endothelium is intact, one may fill the joint to bursting without injecting the periarticular lymph channels.

When injured, the synovial endothelia tend to revert to a primary form; they turn into granulation tissue, lose their specific character, and end as scar, as adhesions or fibrous bands. Years of experience have taught us to respect the endothelium of the belly, to depend upon its power of combating bacteria when uninjured, to try to preserve its specific nature, and not to cause it to degenerate by rubbing it with gauze or destroying it with chemicals. Our experience with joints has not been sufficiently general to make these principles as widely known in the treatment of infectious arthritides as they are in peritonitis.

Payr[1] has made a classification of the sources of joint infection that is of much practical value. He says that bacteria may reach the joint from four sources: (1) directly from without, being carried in by a bullet or entering through an open wound; (2) through a fissure in an infected bone or through a communicating bursa; (3)—in exceedingly rare instances—through the encroachment of an infectious process from the neighboring tissues; and finally (4) through the blood stream, as in the metastatic joints of pyemia.

It is important to keep apart each of these four sources of infection,—the direct, by means of a missile; the indirect, through a fissure in a bone; the secondary, by spread of a neighboring suppuration, and the metastatic. It is important, not only theoretically, but practically.

Each kind of infection has its rational mode of treatment. If the bacteria are carried in by a foreign body, obviously the thing to do is to get the offending invader out as soon as possible. If it is removed early, before the lining of the joint and the capsule have been irreparably damaged, recovery with complete restoration of function may be expected.

If the invasion has its source in an osteomyelitis which pours pus into the joint through an infected fissure in the bone, or if the pus arises in an infected bursa, it is useless to hope for improvement as long as the primary focus is active. If the original infection lies in a bursa, merely opening it may allow the joint to heal without attacking the main cavity at all. If, however, the pus comes from a fissure in the bone, if there is necrotic marrow, or sequestra that act like a foreign body and keep up a continually active bacterial focus, it is hopeless to strive to preserve the joint. The best we can do is to remove the dead bone, or if a manifestly infected joint fracture comes into our hands early, to forestall a certain sepsis by a thorough primary revision, removing loose fragments of bone and foreign bodies, and beginning antiseptic treatment before sepsis and deeper invasion of the tissues have begun.

The third source of infection,—from a neighboring focus of suppuration, is exceedingly rare. There are pus joints, it is true, where it seems as though a secondary indirect infection must have taken place; where a man shot through the thigh, three or four inches above the knee, for instance, develops a purulent joint. Careful scrutiny of the wound channel, however, will usually show that the connection is a direct one—will reveal a fragment of shell lodged in the suprapatellar bursa or some other communicating cavity. Opposite observations are certainly frequent and astonishing enough. One may see enormous streptococcic abscesses reaching from the ankle half way up the thigh, or have the leg rotten through and through with a gas phlegmon and yet see the knee uninvolved, with no exudate and with perfectly clean joint surfaces and synovia. Osteomyelitic foci in the epiphyses of the tibia may slowly reach the knee or ankle, pieces of disintegrating cartilage may even come out of a cavity in the end of the bone marrow and thus prove the involvement of the joint, and yet the suppuration may not spread further and the man may remain fever-free. Such joints are usually the seat of a subacute arthritis with much atrophy; the capsule is more or less swollen, boggy and contracted, and the joints remain stiff; they may finally ankylose completely, but active joint suppuration and sepsis scarcely occur. Active suppuration and sepsis scarcely occur *if* the joint is left alone. The greatest danger to the joint lies, not in the nearby focus, but in the hands of the surgeon who opens it under a mistaken diagnosis. If the men are seen early, and if one surgeon has them in hand from the beginning, it is usually not hard to say whether there is pus in the joint or not. But if, as in military practice, the wounded have passed through three or four hands, it may be impossible to say, when they come to you, whether the pus lies in the joint or outside. The only thing to do is to wait and see. One certainly runs much less risk of spoiling a joint that lies near a suppurating wound by waiting and watching it for three or four days, than by opening it too soon and finding nothing but the pus that one's own hands have wiped into it. One cannot emphasize too strongly the necessity for distinguishing between pus *in* a joint and pus *around* it. To open it unless the pus is *in* it is to ruin it forever.

The last form of infected joint is the metastatically infected one. If there is pus, incise and let it out; if in doubt, the aspirating needle will tell.

The four sources of infection and their treatment, then, are: (*1*) *Direct infection from without; remove the offending material as soon as possible.* (*2*) *Indirect infection from communicating bursae or joint fractures; treat the primary focus, resect if necessary, resect prophylactically if manifestly infected.* (*3*) *Secondary indirect infection from neighboring abscesses—rare; leave the joint alone unless sure it is involved.* (*4*) *Metastatic infection; evacuate the pus.*

All of these infections, whatever their origin, may at one time or another lead to similar pathological and clinical lesions. Of these, there are two distinct groups,—distinct in their course, in their severity, and in their aftereffects. The first is the suppurative form, without deep involvement of the joint capsule; the second is the drier form, the capsule phlegmon. It is important to keep them apart. The whole future of the joint, whether it is to be movable or permanently stiff and crippled, depends upon whether the capsule is deeply involved or not,—whether the bacteria are merely in the joint cavity or whether they have wandered out of the cavity and infiltrated the capsule. If the deep capsule is unaffected, the nature of the exudate is not of decisive moment—whether serous, bloody, fibro-serous or frankly purulent, the damage is capable of complete repair. If, however, the synovial lining is destroyed, if the capsule is swollen and inflamed, the joint is gone. The swelling will close the fine vessels that pass from the capsule into the ends of the bone, the bone will atrophy, granulations will sprout from the synovia, cover and erode the cartilage, adhesions will form, and the joint, if it does not ankylose altogether, will be permanently roughened and stiff. These two forms, then—the exudative and the phlegmonous—should be recognized and kept apart.

The exudate may consist of turbid or bloody serum and fibrin or of frank pus—empyema. It first distends the loose para-articular bursae. The joint is swollen, not cylindrically, but irregularly. The contours of the distended and fluctuating bursae stand out. The adjacent soft parts are but little inflamed—neither hot, tender nor painful. The joint may even be moved to some degree without pain. The temperature is usually high, but there may be remissions in the morning. There may be sweats, sometimes even chills. The white count is increased. The swelling alone may be the distinguishing feature,—the other symptoms moderate or absent. The irregular, fluctuating distention of the para-articular bursae and the aspirating needle make diagnosis certain. One must be on the lookout for these joints. Septic patients may not complain of them nor speak of them spontaneously—they are not painful enough.

If pus is found, the cause—a foreign body—should be removed and the pus drained off. The joint, however, should not be left open. We have learned that if the cause of a peritonitis is removed, the belly will usually take care of itself; that to leave it wide open in the hope of draining it is not only unnecessary but harmful, and that the best way to keep the peritoneal endothelium intact, to keep it from forming adhesions, is to let it alone. So with a joint. If it is kept open, exposed to the air or covered with gauze, both synovia and cartilage are lost. The synovia turns into granulation tissue and the joint obliterates. Therefore, let the pus out through a small stab, just large enough for a drain, keep the cavity intact and remove the drain early, as soon as the pus disappears. If the joint is opened wide to extract a foreign body, the synovia should be sewn up loosely, and a smooth, non-irritating drain, preferably a glass tube, introduced. It is interesting to watch the drain. The day after operation, or perhaps in 48 hours, it will contain, not pus, but clear serum or a transparent yellow coagulum. This is the time to take the drain out. The man may still have fever and the joint may be full of fluid again the next day. The fluid does not matter; it does no harm but good. Distention will keep the capsule from shrinking and adhering. In the course of three or four days the temperature will begin to fall and the swelling recede. If it continues, the joint should be aspirated to see whether it does not contain serum instead of pus before it is reopened. One or two further aspirations, or perhaps another 24 hours of drainage through a stab wound may be necessary for the exudate to disappear permanently.

The joint may be irrigated through the drainage tube. Payr recommends leaving 10 cc. of camphor-phenol in the cavity; others[2] have gotten much benefit from Carrel-Dakin's solution. This is probably the best antiseptic to use; it not only sterilizes the joint, but dissolves fibrin and coagula. If but an isolated part of the cavity is involved, irrigations or injections should not be practised; in any case they should be gentle. Pressure may force bacteria into bursae or pouches originally uninfected.

Several days of fever need cause no alarm. Temperatures of 102-103° quite commonly follow arthrotomy.

Blood in an uninfected joint remains fluid a long time, for weeks,—an infected hemarthros contains small shreds and clots. A smear will show an undue proportion of leucocytes, but a culture may be necessary to determine finally the presence of bacteria. If the exudate is bloody, antiseptics like camphor-phenol, which clot blood, should not be used.

We stated that a joint consisted of a series of communicating cavities rather than of a single large one, and that even the large main cavity was divided into separate chambers. Some of these may be infected, while others are not. A knee may contain pus under the quadriceps and in front of the crucial ligaments and clear serum behind. The elbow may have pus in the olecranon fossa and be unaffected in front. In these cases of isolated empyema it is important to know where the pus lies, to see where the swelling is, and which part of the joint fluctuates. If the pus lies in front, drain the front. If behind, drain the back. If it lies in a bursa, drain it. If in several, drain each one. But do not drain the unaffected portion of the joint. Let it alone and, above all, do not pull a drain through from the purulent into the uninfected part. The usual text-book incisions are rarely indicated. Through-and-through drainage across the knee above the patella, for instance, is quite useless. Early cases had better not be treated with traction—the distention of the joint may let pus flow from an infected pocket into healthy parts.

Until the swelling has gone and the temperature fallen, the joint should be kept quiet in a splint and treated by some method of hyperemia, preferably baking. Passive congestion is not so good. As soon as temperature and fluid have disappeared the splint should be removed and the man encouraged to move his limb; actively at first, then with semi-active exercises in some form of swinging apparatus.

All energy should be bent upon prompt treatment. In this exudative form of arthritis we can save not only life and limb, but the joint, provided we get at it before the capsule is invaded.

In the second form of infectious arthritis, in the capsular phlegmon, we must content ourselves with more modest aims. We cannot hope for the joint. We must strive for life and limb. A phlegmon presents a picture quite different to that of an empyema. Tenderness and pain are marked, the joint is held anxiously stiff. The slightest movement is painful, but the swelling is less than in empyema. The contours of the joint can no longer be made out; the spindle-shaped swelling reaches all the way around the limb. There is periarticular edema above and below the joint, but the borders of the capsule may sometimes be felt through it as a hard ridge. The skin is thin and hot, red or cyanotic. The muscles are much wasted. If the phlegmon is of long standing, the region may be riddled with sinuses that pour out a thin watery pus and flakes of fibrin. From their mouths protrude thick, glairy granulations, covered with a firm membrane that makes them bleed when it is pulled off. The membrane is characteristic. A sinus that discharges much thin pus and whose granulations are covered with membrane is almost pathognomonically certain to lead into a joint. The joint itself is usually shrunken and empty rather than distended with fluid. The pus comes mainly from neighboring bursae or intermuscular abscesses. The capsule is swollen, boggy, reddened, and bleeds easily. The joint cavity is obliterated by organized fibrinous deposits. The cartilage is eroded; its edges are overgrown by synovial granulations. It may be undermined by them in places and exfoliate in green or yellow flakes, exposing the granulations that cover the end of the bone. If the phlegmon is the result of an osteomyelitis that has found its way into the joint through a fracture, the epiphyseal marrow may be full of pus, the ends of the bone black or green, dry and necrotic, and the blood sinuses plugged with dark clots or pus. The x-ray will show decalcified bone; the corners of the epiphyses will be irregular and hazy.

As time goes on the bursae and weakest parts of the capsule give way, and the pus pours out into certain typical spaces between the muscles. It may appear at so great a distance from the wound that one may never think of its articular origin unless one has learned to recognize these long tubular pus sacs. A suprapatellar bursa, for instance, breaks through into the loose space under the quadriceps, makes a huge abscess along the front of the thigh, and appears at the inside of the groin, or below and behind the trochanter. The bursae below the heads of the gastrocnemius break through into the deep muscular planes of the leg and reach the skin at the side of the Achilles tendon, above the ankle. The shoulder joint breaks through along the biceps tendon and appears at the inner side of the biceps, above the elbow. Waxy edema or brawny infiltration of a limb, without much tenderness, should excite suspicion of this form of abscess.

The temperature in capsular phlegmon is continuous, but it need not be high. Remissions alternate with exacerbations as new bursae are involved and fresh abscesses appear. The white count is moderately increased—10,000 to 18,000. Loss of sleep and sepsis cause the men to fall away rapidly; drenching sweats, septic diarrheas, amyloid, apathy and coma signalize the danger of death. In the hip joint the temperature may be continuously high, as in typhoid, or intermit-

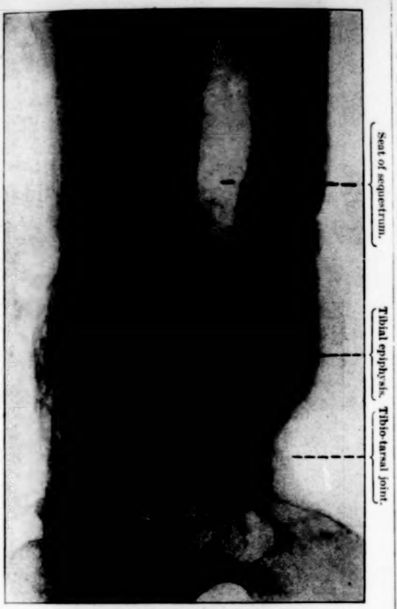


Fig. 1.—Obliteration of tibio-tarsal joint after osteomyelitis of tibial epiphysis. Joint remained free of pus.

tent, as in malaria; the depth of the joint conceals it from examination so that mistakes for one of these diseases are by no means impossible.

As the man recovers, the joints stiffen and contract in typical positions of flexion. The swelling recedes, the sinuses close, but muscular atrophy remains, and all attempts at restoring motion by passive or active exercises are unavailing.

Treatment offers great difficulty. One will never cease to have patients who, whether they recover or succumb, one would wish to have treated otherwise.

A certain number of phlegmons may be prevented; all of them, perhaps, if the men were treated immediately after injury by sacrificing numerous joints. The indications in the two extremes are simple; empyemas—the lighter cases, may be prevented from going on to a phlegmonous course by proper early treatment as outlined above; in the graver cases—obviously infected joint fractures—the joint should be sacrificed from the beginning. It should be opened widely as soon as practicable, the path of the projectile, shreds of fascia and blood-soaked tissues excised and foreign bodies extracted. The ends of the bone should be inspected; loose fragments and those attached by slight shreds of periosteum, whose life appears improbable, should be removed. The joints will be stiff at best. If we leave bone that is likely to die we stand a good chance of having a suppuration that will cost life or limb. The joint should be filled with an antiseptic or irrigated with the Carrel-Dakin solution. If this solution is not used multiple drains should be led out of the dependent parts, *i.e.*, the back, and the capsule loosely closed in front. The limb should be immobilized in a splint or fenestrated cast and kept quiet until danger of sepsis has passed. It should not be disturbed for unnecessary dressings—too many are as bad or worse than too few.

The cases which are hard to know how to treat are those lying between these extremes, but where the phlegmon is well established. We are beset by difficulties at every turn. If we wait too long we lose the man. If we amputate too early we lose a limb which might, perhaps, have been saved. If we immobilize it is difficult to watch the joint. If we do not, sepsis continues. We are between many fires; certain general principles of treatment, however, apply everywhere.

A phlegmonous joint should be securely fixed in slight flexion by a well-fitting splint, or by a circular plaster cast fenestrated widely enough

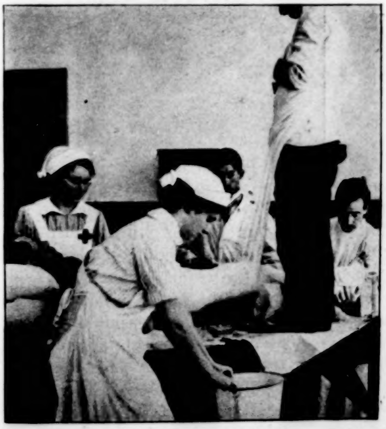


Fig. 2.—Changing cast for injury of knee.

for the limb to be watched and kept immovable during dressings. An interrupted bridge cast, which leaves the joint free all around, is not as good as a circular one. The joint sags down between the two halves of the cast. If the plaster or splint has to be removed, the joint should be kept quiet by slings suspended from a frame or slipped over the shoulders of an assistant, so that the patient may not move it while under the anesthetic. A glance at Fig. 2 will explain. If provision is not made for keeping the joint quiet during operation, the patient's struggles may so spread infection that the operation may do more harm than good. Every movement is followed by an exacerbation of fever and local symptoms. Unnecessary transportation to and from bed should be avoided. Small abscesses may be incised under local anesthesia without removing the splint or taking the man from bed.

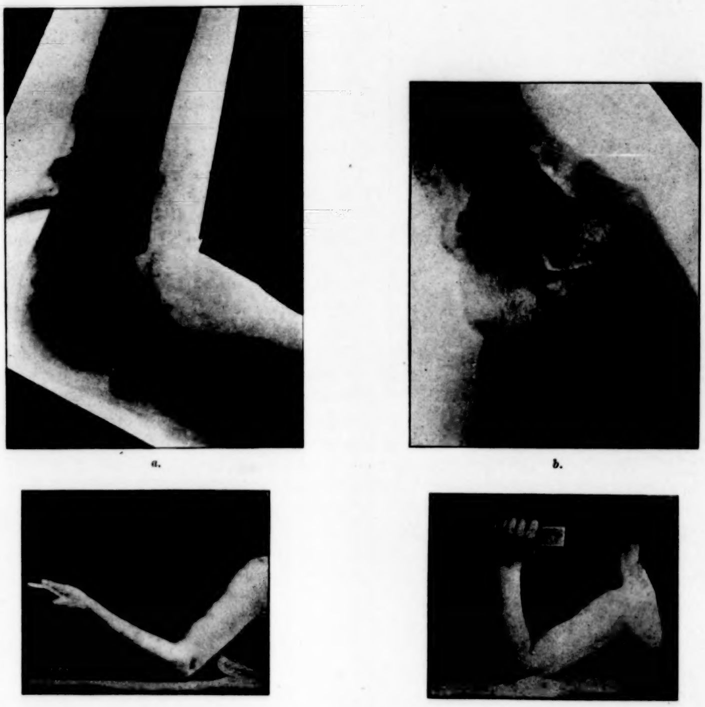

a. b.
c. d.

FIG. 3.—Gunshot wound of elbow; *a*, *b*, x-rays five weeks after injury; *c*, extension and supination; *d*, flexion and pronation after conservative treatment.

Treatment varies with different joints. Sepsis in the upper extremity is not so dangerous to life or limb as sepsis in the hip, knee or ankle; on the other hand, resection in the arm is not nearly so crippling as in the leg, and usually results in mobile joints.

The shoulder, unless the bone is splintered, mostly heals without resection, often with a good movable joint. It should be treated in abduction so that pus may not sink down along the biceps, and so that if the joint stiffens, the man may still abduct by using his scapula.

The elbow is so complex a joint, and suppuration in it is so tedious that it is best to resect moderately early, say in two to four weeks, if fever and phlegmon have not disappeared by then. If the radius is broken at the neck the head becomes necrotic and sequestrates, but ordinarily the classical resection of both radius and

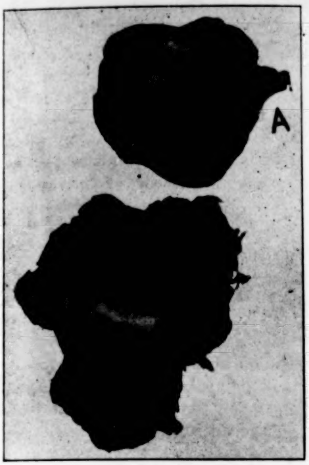


Fig. 4.—Late resection of elbow. "A", head of radius sequestrated and eroded.

ulna is better than a hemi-resection of one or the other bone, even though only one of them be affected. In joint fractures the elbow almost always stiffens, so that a later resection or some form of arthroplasty is necessary. An early resection will save this.

Sepsis in the wrist and carpus is obstinate. The hand long remains swollen and tender, and abscesses appear above and below the wrist, especially along the deep fascial planes of the forearm. Suppuration in the carpal joints is often followed by pyemia. As long as the man's general condition seems good one may wait, keep the wrist in dorsal extension in a splint, bathe the hand in hot brine, bake it and see whether the carpals become necrotic before excising them. The wrist stiffens, but the men have a fair grip if it stiffens in dorsal extension; even excision of the carpals leaves a useful hand. If excision is done early enough, exarticulation at the wrist will rarely be necessary.

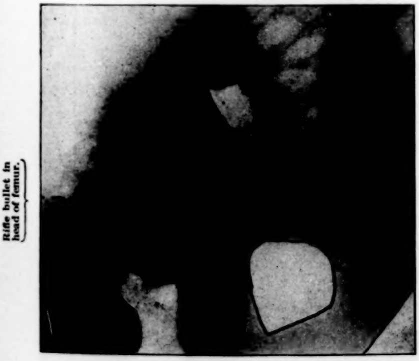


Fig. 5a.—X-ray 11 days after injury.

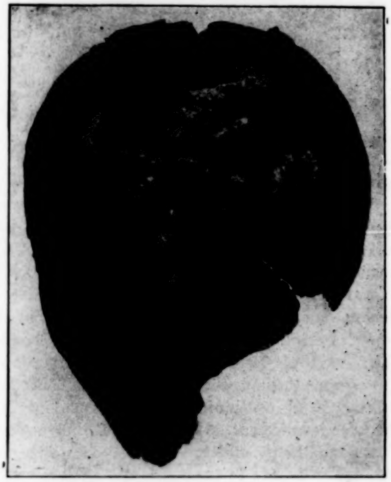


Fig. 5b.—Gunshot wound. Fracture of head of femur. Rifle bullet found in head of femur. Septic hip joint. Necrotic and putrid head removed 11 days after injury. Recovery.

Capsular phlegmons in the lower extremity and their sequels give some of the gravest cases in military practice. Septic hips make long and high fever. One recognizes them mainly by tenderness over the head of the femur at Poupart's ligament. Mobility may be not much impaired. If recognized, they need not be so much dreaded as suppuration in the knee. A broken head of the femur should be removed early; it will die and rot and have to come out anyway. The joints should be left well open after resection and drained to the rear and outside. Jones' long frame and adhesive plaster traction will hold the leg quiet. A plaster spica is almost impossible to keep from getting foul and the men develop bed-sores under it. The joint may contain very little pus. In one case I suspected suppuration from the continued fever and joint tenderness. I opened the hip, but could find nothing abnormal. I closed the joint. The man

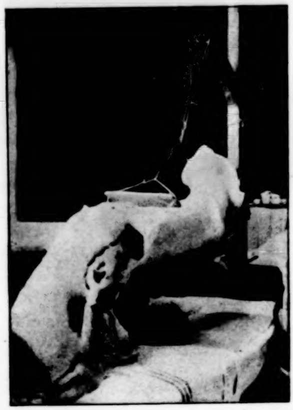


Fig. 6.—Suspended and fenestrated cast for wound of knee.

got well and kept a perfectly movable hip. The joint must have been infected in spite of the apparent absence of pus.

The most difficult joint phlegmons to treat are those of the knee. I think one of two courses is best: The first is to treat them conservatively, immobilizing with Thomas splints or widely fenestrated plaster casts in a few degrees of flexion, suspending the whole splint from a frame, baking the joints and watching them daily—not only the knees but the men—incising abscesses as they appear, irrigating with Dakin's solution, and continuing this treatment until the knee is quiescent. If, however, the knee gets worse and the general condition becomes alarming, one will have to exarticulate or do a Gritti operation. In the Gritti the patella should be left in the anterior flap and wired into place later, after the wound is clean. The disadvantage of this conservative method is that by the time one decides to exarticulate, multiple incisions of abscesses have so spoiled the soft parts that one gets but a poor stump. The other plan is to do an early resection with posterior drainage or with the Carrel-Dakin irrigations. This procedure is the one to follow in shell wounds complicated by fracture. To be of use, the operation should be done before para-articular abscesses have burrowed their way up and down the limb. Once the pus has traveled away from the joint, resecting the ends of the bone will not save the leg.

I can heartily warn you against the other method of treatment—the method of opening the joint wide, cutting across the crucial ligaments and splitting open all the bursae. It looks beautiful when you have done operating; the joint is wide open, everything is exposed, and if you put on a few pounds of traction you may separate the femur and the tibia for an inch or more, but—the men all lose their legs. The back of the tibia becomes rough and erodes the popliteal artery, and it bleeds, or abscesses burrow up and down, and you have to amputate anyway.

There remain, of course, early amputations and exarticulations. Military exigencies may force one to them, but they should not be done if there is a chance of watching the man while his limb is in danger.

Suppuration in the ankle and the tarsals is as tedious and painful as it is in the hand, and more dangerous. Suppuration in the foot seems prone to make all sorts of unforeseen complications—thrombophlebitis and encephalitis and pulmonary infarcts, and other rare sources of anxiety. Apart from these complications, if one

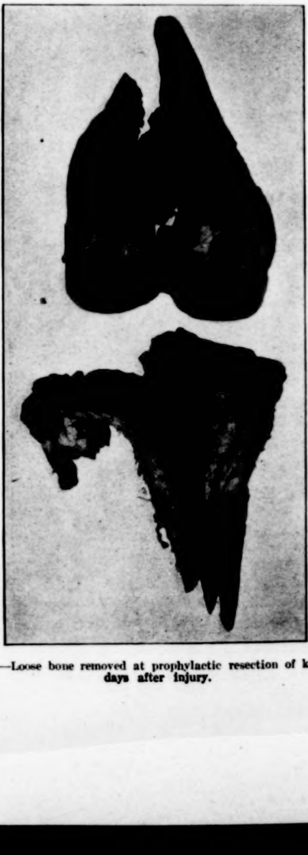


Fig. 7.—Loose bone removed at prophylactic resection of knee four days after injury.

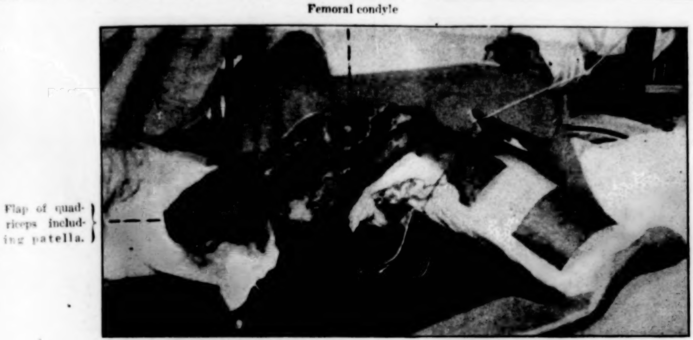


FIG. 8.—Capsular phlegmon of knee with intermuscular abscesses; joint opened widely. Open wound treatment. Subsequently erosion of popliteal artery, fulminating hemorrhage, exarticulation, finally recovery.

keeps the foot quiet in a splint or cast, bakes it or soaks it in hot brine, it tends to get well. Para-articular abscesses appear, or rather, conceal themselves in the sole, where the thick skin and fascia hide them, unless one watches closely. They should be incised from the inner side of the foot, so that the man may not tread on the scar afterwards. If suppuration does not cease, the astragalus may be resected with benefit and without doing much harm to the foot. One certainly should not amputate without trying both this and all other kinds of atypical tarsal resections. Any kind of a misshapen elephantine foot, if it is sound and has good skin and fat on the sole, is better to walk on than no foot at all.

Now we have not considered wounds, but traumatic infections of the joints. Are there no joint wounds that are not infected? Yes, some perforating gunshot wounds heal perfectly aseptically under conservative treatment. Some even with foreign bodies, especially rifle bullets, may be treated as though they were aseptic if one gets them early. As soon as circumstances permit of aseptic operating, the wound of the soft parts should be excised, the joint opened, the foreign body extracted, and the joint closed. If asepsis is doubtful the synovia should be closed, but the skin and other soft parts left open or sewed together quite loosely; or the joint itself may be drained with a glass tube for 24 hours. A few days of fever, 102° or so, either before or after operation, do not spell disaster. All these men have temperatures which often drop if the limb is immobilized and the patient left alone.

Aseptic cases, like empyemas, should be allowed

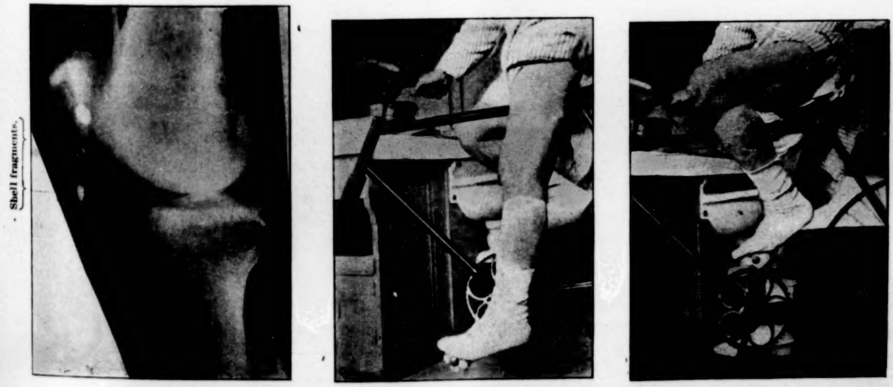


FIG. 9.—Shell wound of knee; fracture of patella. Synovia closed by suture. Recovery of function four weeks after injury

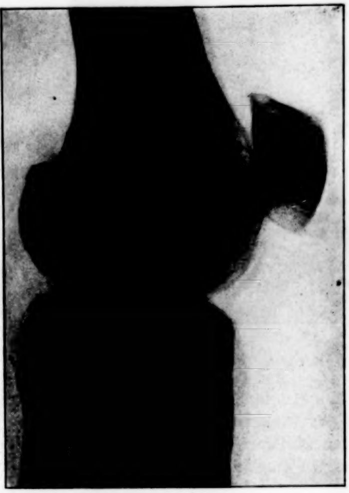


Fig. 10.—Piece of steel imbedded in posterior part of external semilunar for three years. Chronic arthritis; lipping of upper edge of patella and upper edge of rear of femoral condyles.

active motion as soon after operations as fever, pain and tenderness permit. Capsular phlegmons should be kept quiet. Endeavors to reestablish motion by manipulation are quite futile and cause the patients needless pain.

Foreign bodies should be removed, even if they heal into a joint aseptically. It is true that, take it all in all, more harm than good has been done in the present war by hunting for bullets, and that extraction operations have caused much needless mutilation and suffering. A joint, however, is no place for a foreign body. An aseptic piece of steel will wear off the cartilage when the joint is moved, cause roughening and incongruity of the articular surfaces, and end in a chronic deforming arthritis. A case in point: A man who had injured his knee by a blow from a steel wedge three years previously had had recurrent attacks of inflammation and hydrops. Flexion and extension were considerably impaired. An x-ray showed a chip of steel in the posterior capsule, although the man had no knowledge that anything had entered the knee at the time of injury. On opening the knee a spot bare of cartilage was seen on the inner femoral condyle. All about it were signs of deforming arthritis. In places the cartilage was peeling off; in others it had peeled off and flakes lay free in the joint. The steel chip was

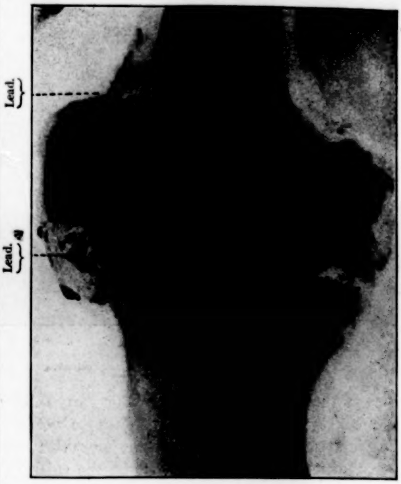


Fig. 11a.—Old gunshot wound of knee. Subsynovial deposits of lead. Severe deforming arthritis.

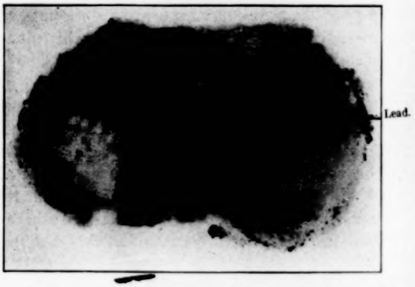


Fig. 11b.—Same case as 11a. X-ray of resected femoral and tibial condyles. Lead in synovial tissues. Erosion of bone by synovial granulations.

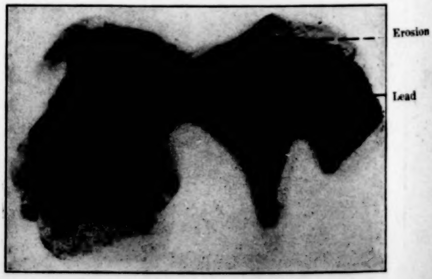


Fig. 11c.—Same case as 11a. X-rays of resected femoral and tibial condyles. Lead in synovial tissues. Erosion of bone by synovial granulations.

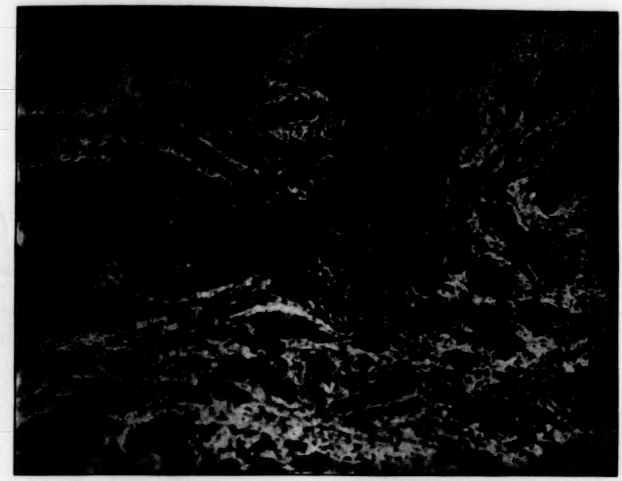
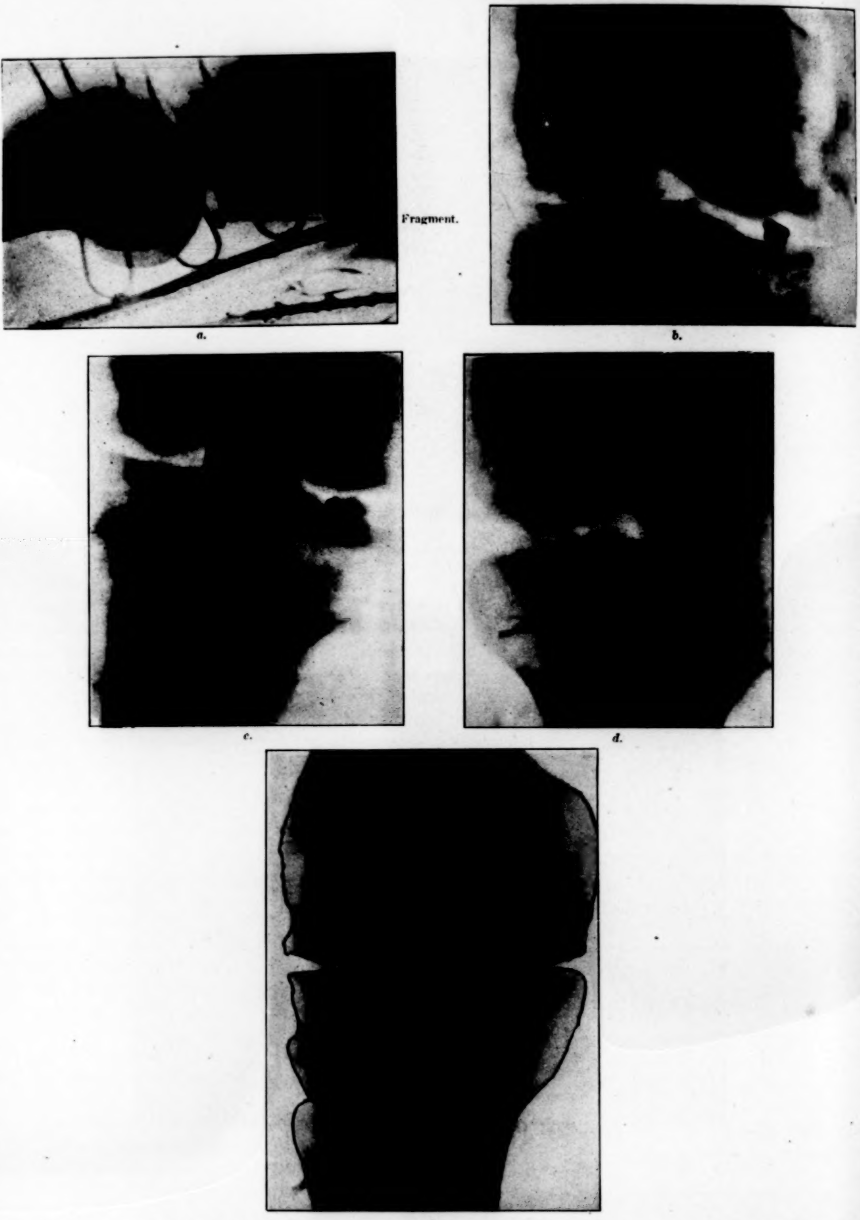


FIG. 11*d*.—Same case as above. Sections of subsynovia, showing lead deposits.

FIG. 11*e*.—Same case as above. Sections of subsynovia, showing lead deposits.



a. *b.* *c.* *d.* *e.*

FIG. 12.—Localization of foreign body by needle method of fluoroscopy. (Holzknecht) *a.* Shell fragment in semilunar cartilage. *b.* First needle has missed fragment. *c.* Second needle has struck it; x-ray in axis of needle. *d.* X-ray perpendicular to axis of needle. *e.* Shell fragment removed. Recovery. Subacute arthritis with considerable limitation of knee motion.

found imbedded posteriorly in the external semilunar and removed. The joint, however, was so changed that it will never regain free motion.

Lead (from pistol bullets or shrapnel) is particularly dangerous. It seems partly to dissolve in the synovial exudate and to settle as a grayish-white deposit under the capsule. It may be seen in sections as black grains lying in the subsynovial tissues. Several men who had carried aseptic pistol bullets in their joints for a number of years have developed an uncommonly severe hypertrophic arthritis.

Extraction operations should not be entered upon lightly. They should be done with competent assistance, under good asepsis and with a good x-ray apparatus. The foreign body may be very difficult to find. It often traverses the joint and is stopped by hard, thick capsule or cartilage. If it lies in tissue of this consistency the finger cannot feel it even when a millimeter or two from it. One may approach very closely with the scalpel and yet miss finding it. Radiographic plates by the MacKenzie-Davidson, or one or another localizing method, do not help nearly as much as the fluoroscopic screen. If the hospital is equipped for aseptic fluoroscopic operations the body may be extracted directly under the screen; if not, a needle may be introduced down onto it under the fluoroscope after the method of Holzknecht and the projectile removed by cutting down on the needle, which is left *in situ* as a guide.

Removal may be particularly difficult in the knee, where foreign bodies are quite typically found buried in the posterior attachment of the semilunar cartilage. If a lateral x-ray plate (like Figs. 10 and 12*a*) shows the body just above the rear edge of the top of the tibia, removal should not be attempted without the aid of a screen. A body imbedded in the cartilage may be impossible to locate without it.

The best time for removal is early—within the first twelve hours after injury. Later, if the joint enters an acute inflammatory stage, it should, if the body is small, be immobilized and treated conservatively with baking and compresses until the inflammation has subsided. The trauma of extraction will set up a strong reaction during the acute stage. Acute generalized inflammation will often quiet down after immobilization; four or five days after the fever falls, the foreign body may be removed and the joint closed loosely over a glass drain.

CONCLUSIONS.

1. Sources of joint infection are:

(*a*). Direct, from without.

(*b*). Indirect, from a communicating suppuration.

(*c*). Secondary, by extension of a neighboring process.

(*d*). Metastatic.

2. Infections may be:

(*a*). Empyematous—prompt treatment will save the joint.

(*b*). Phlegmonous—the joint will stiffen.

3. Leaving a joint wide open is harmful. Treatment should strive to preserve the synovia.

4. Foreign bodies, especially lead, induce deforming arthritis, and should be removed.

REFERENCES.

[1] Münch. med. Wchsft., 1915, Nos. 37, 38, 39, pp. 1241, 1282, 1321.

[2] Campbell and Wolfenden: Lancet, Vol. cxciii, p. 185.

TRENCH SANITATION.*

By Captain C. E. Burt, M.R.C.,

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In the consideration of a subject so important, it is to be regretted that more literature is not available. Physicians who have the subject from first-hand information are all more or less engaged in the work of the war, and have little time to write. The Advisory Committee of National Defense is taking up these subjects most essential to us, and is having manuals printed, revised from the English and French, which will soon be in the hands of the members of the Medical Corps. This paper will deal with the most important subjects, with a short description of the most particular methods that the peculiar environment abroad has developed in modern trench warfare, which I have collected from those who have written, and conditions which I have personally observed as battalion surgeon of the trenches in the training camp. I assure you, however, that I make no claim for personal originality, but give due credit to those who have been able to write.

You are all much better acquainted with trench conditions from your readings and from the lectures by the Allied officers than I am, so that you can easily draw upon your vivid imaginations to realize the difficulties encountered in dealing with this most important subject.

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* Read at a meeting of brigade officers at the request of the commanding general.

The vital things to be considered in sanitation of the trenches can be divided into five headings, namely: (1) Food, (2) Water, (3) Conservancy, (4) Personal Habits, (5) Prevention of Special Diseases.

(1) THE FOOD SUPPLY.

The food supply is brought to the supply depot by animal carriage. From there it is drawn as required by hand carriage to the kitchen, where it is prepared for consumption, and placed in jacketed hot boxes, which are carried to the troops in the firing line trenches by hand. The one idea in the preparation of food is the use of the heat-retaining type of cooker—"fireless cookers"—which give *en route* no smoke which might draw the enemy's fire, therefore the present vogue of the traveling kitchen or field cooker in the zone of the advance. This cooker consists of ovens and hot-jacketed boilers arranged around a central furnace, all contained in the body of a wagon. The limber contains hot-jacketed receptacles, compartments for rations, utensils, food, etc. It can be detached from the body and, being drawn by one horse, is used for food distribution while the body continues the cooking. The whole is drawn by two horses, weighs twenty-four hundred pounds and cooks for two hundred and fifty men and their officers. On the march it travels with the first line of transports. From these, or from improvised dugouts conveniently situated, food is carried by hand in jacketed boxes and covered tins through the communicating trenches to the troops at the front. The medical officer is charged with the following details:

Quality, variety, and cleanliness of rations and stores.

Quality and variety of cooking.

Cleanliness in delivery, preparation and sources of food.

Health of all persons issuing, preparing or serving food.

Kitchens protected from dirt or dust.

Towels require most detailed daily inspection.

Instead of screening the entire kitchens,—which was our former plan,—it is found that the screening of food itself is a better substitute and the fly nuisance better controlled. Screened cupboards or safes are used for meat, bread, jam, open tins, or other food attractive for flies. Eating utensils are kept covered. Simple muslin squares, weighted at the corners can be used for much of this work. Covered barrels or tins are employed for the bestowal of refuse previous to incineration. Flies have been very troublesome in France. This is due, to a considerable extent, to the dead bodies in front of the trenches in "no man's land," and as the condition cannot be prevented in trench warfare, flies must be present, and measures must be taken against them. Fly poisons are not effective unless the trenches are free from water. All débris must be collected in bags and carried to the rear at intervals. No food should be thrown away or allowed to collect, as this attracts rats and flies.

The kitchens should be constructed in shelters large enough to accommodate the rolling kitchens. The stove pipe should project somewhat above the top of the shelter, to secure good draft. In addition, numerous ventilating holes must be made. Small fires built of dry wood in the bottom of deep trenches do not betray their position. There are stoves in the support trenches in which a certain amount of cooking can be done, and where socks, etc., can be dried.

Grease in sullage water, resulting from cooking processes, is often quite a nuisance, and a simple method of getting rid of it has been devised in the form of a grease trap. A box is filled to a depth of several inches with clean sand, and a vertical partition placed in the middle, which dips down at its lower edge for a couple of inches into the sand, making two compartments. The sullage introduced into one side filters through into the other under the partition, leaving most of the grease behind. The effluent disposal is usually not difficult. The tax on the sand is lessened if the sullage be first freed by passing it through such material as hay or chopped straw (tibbin); this plug entangles the floating grease, and the whole mass can be removed and burned. The sand must be periodically renewed, and this should be done at intervals not exceeding a week, the sand being burned and replaced if scarce.

(2) WATER.

The minimum of three gallons of water is required by each man when no clothing is washed. Of this amount only three pints is used for drinking purposes. Water tanks are set up at distances of one thousand yards or more from the first line trenches, obtaining their supplies from pipes when such a system is available, or otherwise from casks. The men in the trenches have their water bottles, which are replenished from a supply of water brought up by hand. The water should be sterilized by boiling or with calcium hypochlorite. The Lister bag may be used. The chemical requires supervision and examination from time to time by titration methods to see that it has not lost its strength. From the tanks, the water is carried in kerosene tins by hand through the communicating trenches and stored as a reserve in dugouts back of the support trench. The soldiers' water bottles are filled there. Cavalry soldiers are supplied with sterilizing tablets for use in the bottles themselves. Impure water may cause typhoid, dysentery, cholera, and other diseases.

It is not expected that real baths can be taken in the trenches, but there is no reason why some provision cannot be made for washing. A reasonable amount of water should be carried to the trenches for washing, and basins may be provided. Even shower baths should be installed in a deep shelter or a cave shelter. A simple arrangement is to provide one or two kettles for heating water, tubs or casks for storing it, placed about nine feet above the ceiling of the shelter. The casks should be connected with a pipe fitted with sprinklers properly spaced. There should be a grating on the floor, and the bottom of the approach trench should have a steep slope toward a drainage pit.

(3) CONSERVANCY.

The extraordinary developments of trench warfare have created the need for so many new devices to meet the consequent new conditions that their demands for detailed comment far exceed the time at my disposal. The conditions to be met with are practically those of a siege. Many methods have been tried: one of the earliest,—an unofficial one,—one of the simplest, a sort of a reversion to the old stink-pot idea of the Chinese. It consists in placing excreta in empty tins and lobbing them into the enemy trenches which happen to be near enough. Reprisals were found so unpleasant that apparently this method has been abandoned by mutual consent— to say nothing of the disagreeable and unsanitary results in first-line fire trenches.

Next the feces were buried in latrine trenches dug as offshoots from the trench system,—the so-called trench within a trench system. The probable length of occupation and the onset of rains soon led to this method being abandoned. Here soil pollution and flooding were the principal objections.

The next modification consisted of a filth trench constructed behind rising ground or other shelter, and approached by a transverse trench cut as an offshoot from the main trench system, but this proved unsuccessful owing to the fact that it was too frequently shot up.

The only practicable solution of this important problem has been found in the system of disposal employed at present by the British, which is to use bomb-proof pits or dugouts leading out of the communicating trenches. The dugout should be deep enough to protect against any missiles except high explosive shells. Here is dug a pit and covered with a latrine seat. Incineration is impossible, for lack of fuel and because it would give the range to artillery. The method adopted has been to collect excreta in small buckets, empty gasoline tins, and similar receptacles. These are set in boxes with a sliding cover, or else have a detachable seat with supports front and back for keeping seat firm, and have a cover hinged with leather, making them fly proof. The receptacles when about two-thirds full, are replaced by clean ones. The buckets are removed by the relieved troops, who bury the contents and bring the buckets, cleaned, back with them on their return. The buckets are best cleaned over a concrete platform, and with the aid of dilute cresol solution, followed by the use of dry sawdust and a stiff brush. If fuel is available, the cans containing the excreta are preferably burned in an incinerator at the rear. If the cans are buried in deep pits, they should be well covered, first using lime or iron sulphate or crude oil to cover the excreta. A combined incinerator and deep filth trench, ten by twelve feet square by four and one-half feet deep, called the "American oil pit," has been used with satisfactory results. The buckets are emptied into the trench, and some straw, waste paper, rubbish, etc., are thrown in. Kerosene oil is poured over the material contained in the pit and the whole burned over. The heat generated serves to evaporate the liquids. When the contents have reached within about three feet of the surface, the pit is filled in with earth and a new one dug.

The commander of the platoon must have latrines dug within half an hour after reaching the trenches, and not the following morning. A man of the medical department, detailed for that duty, should disinfect the latrines daily. This man should be sent for if he does not come. The disinfectants employed are sulphate of iron, 10%; cresol, 5%; and unslacked lime or milk of lime. The health of the troops demands very careful sanitary arrangements and scrupulous cleanliness in trenches, which may have to be occupied for a considerable length of time. A supply of chlorate of lime should be kept in all trenches.

When the level of the subsoil permits, the urine soakage-pits and funnels are as useful here as elsewhere, or even more so. The urine may be handled by separate urine buckets and disposed of as already mentioned. A urine absorption pit may be dug in a convenient place in the bomb-proof pit. A pit is dug four to six feet deep and four feet square, loosening the earth at the bottom and then filling up with stones or perforated tin cans to near the top. A layer of brush or grass or sacking is placed over the stones, and the whole filled with earth, level with the surface of the ground. Funnels painted white, six inches in diameter at the top, tapering to two inches at the bottom, may be built into the four corners, or a galvanized iron trough, conveniently situated to catch the urine, may be led into it. Loose plugs of hay should be placed in the funnels. All soiled areas, as well as the funnels or trough, should be treated twice daily with a 5% cresol solution. There should be a grating for the men to stand on, and the floor of the trench should have a decided slope for drainage.

In the disposal of human bodies, the method of incineration is most sanitary, and generally satisfactory. However, the British, for sentimental reasons, have not adopted it in the present war, and I understand they have had no particular trouble in carrying out the usual methods of disposal by burial. It is probable that we shall carry out their example.

(4) PERSONAL CLEANLINESS.

Out of evil comes good, so in this war we medicos have discovered the important fact that the body louse is the transmitting agent of typhus fever. Prevailing conditions in northern France and Belgium, plus *overcrowding,* make it impossible to banish the louse entirely. Therefore, every attempt must be made to reduce this pest to a minimum. Individual personal cleanliness of the body and clothing is the only preventive or palliative method. The Sanitary Corps must do everything possible to afford facilities for the necessary delousing by the wholesale of the troops. It is essential that provision for systematic bathing be made for these men when they return to camp for their period of recuperation. On the Western front, bathing and delousing are carried out with the division as the unit. The necessity for system will be seen when it is stated that one hundred and sixty men must be bathed and deloused per hour for nine hours a day if each man in the division is to receive a bath every two weeks. This is certainly not an excessive requirement, and bathing must at least be as frequent as this. Ironing of the clothes is relied upon to rid them of lice. The clothes are, of course, disinfected by sterilization by the Thresh disinfector, or the field box disinfector, or the "Serbian barrel."

The personal use, beside frequent bathing, changing and washing of the clothing, of certain local applications, has been proved by the British to be quite effective. For killing adults, a powder known as the N.C.I. is dusted on the underclothing. This powder is composed of naphthalene, 96 parts; creosote, 2 parts; iodoform, 2 parts. About two-thirds of an ounce is required for each man. A special ointment has been found to have the effect of asphyxiating the young as they hatch out of the ova. This is rubbed into the interior seams of the various articles of clothing in the quantity of about one ounce a week. It is composed of crude mineral oil, 9 parts; soft soap, 5 parts; and water, 1 part. The body from the neck down may also be anointed with this paste. Recently a method said to be successful is to impregnate articles of underclothing by dipping and wringing them out in a solution of 1% each of naphthalene and sulphur in benzine or gasoline. This is the English "antiparasitic" vest and is not especially irritating to the skin. Let eternal vigilance be your motto!

(5) PREVENTION OF SPECIAL DISEASES.

Nearly all epidemic diseases are transmitted by water, the soil, or from man to man. Large commands crowded into a small area are particularly liable to infectious diseases and, therefore, all sanitary measures prescribed must be rigorously enforced. We must not forget that trench life is very monotonous and trying, and therefore company commanders must use every effort to keep their men comfortable and cheerful.

Trench feet, due to prolonged exposure to the cold and wet on dependent limbs, can be prevented to large extent by the following precautions:

1. Boots and shoes should be at least a size too large, so that two pairs of socks may be worn.
2. Rubber hip boots should be furnished if there is standing water in the trenches.
3. General circulation must be kept up by keeping body warm and dry. Wear waterproof clothing, especially in rains.
4. Every 24 hours the boots should be removed, the feet rubbed, and dried, and dry socks put on.
5. Thorough rubbing into the feet and legs of whale oil or anti-frostbite grease.
6. If rubber boots are not worn, the boots should be well oiled or greased.
7. Drainage of trench or dry standing provided. Avoid standing still as much as possible.
8. Keeping the legs elevated while resting, and the avoidance of the sitting posture in sleeping.
9. Avoid fatigue by keeping up the physical condition of the soldiers by proper nourishment and warmth. Frequent use of hot soups and rum fills the bill.
10. Puttees should be loosely applied.

Trench fever is another of the developments of the peculiar environmental conditions of the war "over there." This is a relapsing fever, resulting in considerable impairment of efficiency, although there have been practically no fatal cases. It is believed to be transmitted by the bite of the infected lice, aided by cold, wet and fatigued troops.

Trench nephritis is probably brought about by the inevitable conditions of the military life at the front. Fortunately, it appears in a mild form and has a favorable prognosis. Symptoms soon yield to rest in bed and a milk diet.

Tetanus seems to be a question of soil pollution plus wounds. All victims of wounds, of whatever nature, simple scratches included, are given at the earliest possible moment after the receipt of the wound, a prophylactic subcutaneous injection of 500 U. S. Army units of tetanus antitoxin contained in about 3 cc. of horse serum. In case of severe wounds a second dose of the same strength is given on arrival at the base hospital.

Another unpleasant and often dangerous complication of wounds, also owing to soil infection, has given rise to most serious trouble. Most of these infections are due to the Bacillus aerogenes capsulatus of Welch, usually called by the British B. perfringens. Prophylactic treatment depends on loose bandaging of the limb, frequent changing of dressings, sufficient drainage of the wound, and the introduction of an antitoxin.

The infectious diseases—typhoid, paratyphoid, dysentery, diphtheria, cholera, cerebrospinal meningitis—should be constantly watched for and guarded against. It is by early detection and prompt action that an outbreak, which may have serious and far-reaching consequences, should be prevented.

Recently I saw an order from the Headquarters of the American Expeditionary Forces, reading as follows: "In all cases of venereal diseases, charges will be preferred as a matter of course, regardless of the circumstances of the case, or the supposed character of the man involved. It is not intended to allow subordinate commanders any discretion whatever as to whether charges shall be preferred. Courts-martial of this command will not accept as a defense in cases of this kind the fact that, at some specified time or times, prophylactic treatment has been taken. Upon proof that the disease exists, punishment will be awarded." This ruling has done much to stamp out this enemy.

In closing let me ask for coöperation and team work between the line officers and the Medical Corps, that efficiency and loyalty may ever be maintained.

BIBLIOGRAPHY.

Sanitation in the Trenches. McCulloch, Jour. A. M. A., Vol. lxix.
Sanitation in War. Lelean.
Medical War Manual No. 1. Veeder.
Medical War Manual No. 2. Goodwin.
Field Service Pocket Book, 1917.
Manual for Commanders of Infantry Platoons, 1917.
Notes for Infantry Officers on Trench Warfare, 1917.

PREVENTION IN PUBLIC HEALTH.*

By D. M. Lewis, M.D., New Haven, Conn.,

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The title suggests to you, gentlemen, that I am going to talk to you in terms of the usual expressions, like "cover your sneeze and prevent infection for others." If now you are interested in internal medicine, and especially in heart diseases, you obtain by an instrument of precision the usual circulatory curves and the abnormal ones by means of the electro-cardiograph, and then base your treatment on the reading of those curves. That there are also curves in public health work in terms of communicable diseases may be shown, and that by treatment based on such curves, records expressed as preventograms may be as exact as those based on heart study.

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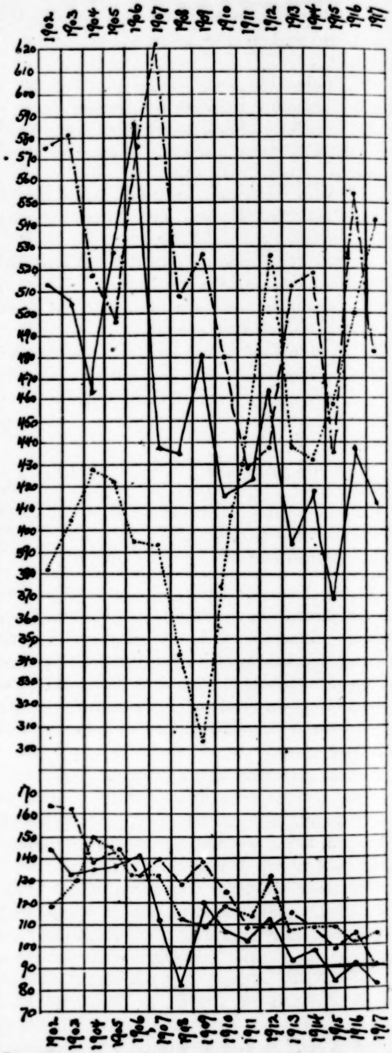
* Read before the County Public Health Association, March 7, 1918.

By charting in terms of 100,000 population the deaths under age 5 (Chart 1), for the three largest cities in the State (the figures gained from the State Board of Health Reports), there will be seen a very definite pulse wave for 1906, with subsidiary waves for 1909, 1912, 1914, and 1916 in the record for New Haven. That for the other two cities is not dissimilar in the case of Bridgeport, though that for Hartford loses its similarity during 1908 and 1909. As this is also in common in all the charts, I will explain that at this time as being a jump in population in 1907 from 98,490 to 101,150 in 1908, 103,808 in 1909, while the population comes back to 98,915 in 1910, and from then on is again in rising ratio with the other cities. This excess population, then, during those years gives apparent absence of similarity. The peak for this city in 1916 is explained by the abnormal number of deaths from poliomyelitis of non-residents brought to our isolation hospital. If now you examine our wheel of fortune (?), now labelled that of certainty (see illustration, this Journal, April 11, 1918) you will see that these curves are exactly the years of measles frequency in terms of deaths. That there is no peak for 1917, when there were more deaths than the last previous maximum of 1906, constitutes what I am pleased to call a preventogram. When we examine the deaths under age 1 per 1000 births, you will see the same peaks of maximum and subsidiary waves for the same years. You will note the absence of a peak for 1917, and there stands out more prominently a remarkable drop in the curve for 1907 and 1908, not simulated either previously or later in this city nor at any time in the curve of the other two cities. I have shown that this is the expression of our work in beginning municipal milk examination for the purpose of feeding babies and infants, fresh, raw uninfected milk, the results of which have appeared in other articles. This also then represents a preventograph curve. I have added the curve of the City of New York to show that, while they lay their preventive work to pasteurized milk and infant welfare, this city, which has been said to have done nothing for infant welfare work, has a record that as yet has not been distanced.

Chart No. 1.

Bureau of Communicable Diseases.



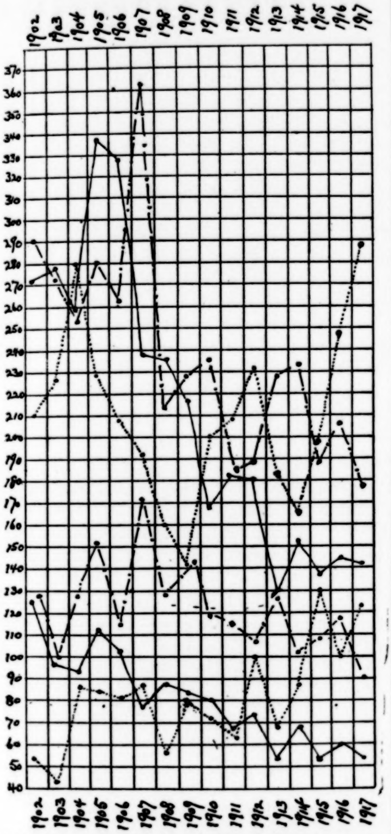
Bridgeport, —·—·—; New Haven, ———; Hartford, ...

Upper part of chart shows deaths under age 5 per 100,000 population. Lower part shows deaths under age 1 per 1000 births.

If now we study the chart for communicable diseases, to which there is added diarrheal diseases under age 2, as being to me definitely com-

CHART No. 2.

BUREAU OF COMMUNICABLE DISEASES.



BRIDGEPORT, — · — ·; NEW HAVEN, ———; HARTFORD, ...

Upper part of chart shows deaths from communicable diseases per 100,000 population. Lower part shows deaths from diarrheal diseases, under age 2, per 100,000 population.

municable, as well as to lift the curve sufficiently above the diarrheal curve as not to cross it, as it would do if studied without it, you will see a very different curve record. The maximum wave is for 1905, with subsidiary waves for 1911, 1914 and 1916. Turning again to our wheel, you will see that 1905, 1911 and 1916 were grippe years; so were 1908 and 1913, but of not sufficient intensity to give curve peaks. I have termed them the waves of respiratory diseases. There follows on these waves each succeeding year thereafter very nearly proportionate measles waves accompanied and followed by increase of diphtheria, whooping cough three times out of four accompanying the measles. I would say here that it is more than a coincidence that after a measles epidemic you placard in the later season for that disease the individuals whom you previously placarded for measles. I wish to call attention to the approximate obliteration of curves in this period—1914-1917—in terms of the other two cities as showing true preventograms, based on my field work, the results of which in terms of separate diseases you are familiar with from my previous talks to you. Remember also that the excess non-resident deaths in poliomyelitis for 1916 would turn the peak of the slight curve in reverse. There is one especially notable point, namely, that the rate for communicable diarrheal disease for this city exceeds but slightly the rate for diarrheal diseases only of another city. It is in such terms that you may figure my statements in our monthly Board of Health Bulletin that we are saving 300 lives over other cities in the State who are expending two and two and one-half times the per capita rate for health work.

The curves for diarrheal diseases under age 2 run exactly parallel to communicable diseases from 1905 on until 1911, when again the measles curves again exceed the grippal curves for the reason mentioned.

I am on record that the control of respiratory diseases will control all of our problems of infections that we of the Public Health are working against. The charts are in accord for this city, as are the measures taken by me during the past four years, in comparison with our sister cities, whose curves are shown mainly for comparing what I have called the preventograms. Is there any practical application for you as health officers, irrespective of the size of your community? There is, and it is this—any frequency of respiratory disease should be investigated by you as to the one ill and the individuals who are the contacts of that one. Grippal attacks may be the pneumococcus, varying streptococci, the meningococcus, as well as other organisms. Find from cultures of the nose or pharynx of the one ill and from the nasal discharge of the contact who has other than an ordinary cold, who is the probable carrier, what organism you are dealing with. By measures of isolation of the carrier, you may prevent illnesses in others. It is not uncommon for me to find in a house the following: An infant dead of whooping-cough and pneumonia; of several older children, one with an unusual pussy irritant nasal discharge prompts me to culture that nose. It is a Gram-positive diplococcus and, failing the laboratory facilities to prove it such, I am warranted in isolating her and curing that discharge. Again, a boy sent out of school on account of an irritating unilateral discharge, shows the same diplococcus. I find in his home a younger boy who is in bed with a bronchitis. One week later the former boy's culture shows K-L as well. Thinking this possibly a mix-up of cultures, I take another, with the same finding. One week later the attending physician sends me a culture from the nose and throat of the boy previously ill with bronchitis, with the diagnosis of nasal diphtheria. The nose culture was positive; the throat culture was negative. The boy was now a nasal carrier, made so by his brother, who had given him his first illness also.

If now you will also read into the reports which are coming out from camps, the successive crops of meningitis cases in terms of "pharyngitis" and "sore throats" of the first set, and then look for the pathologic picture in one or more of the contacts of the cases, you will find, not the one who picked up the organism from contact of the sick, but who, because he is a true carrier, made one or more sick. I have shown you that in diphtheria; it will be proven so in pneumonia. Practically, you who have no advantages of a fully-equipped laboratory for proving what organism you are dealing with,—and we are as yet in the same condition,—may obtain preventograms for your community by searching for and isolating all abnormal nasal discharges. You will get ahead of reported cases of various diseases.

Medical Progress.

PROGRESS IN GYNECOLOGY.

By Stephen Rushmore, M.D., Boston.

(Concluded from page 539.)

Myoma—Operation and Radiation.

Case[14] compares the operative with the "radiotherapeutic treatment" of uterine myomas. Since the effect of the gamma rays of the radium and the hard roentgen rays are about the same, radiotherapy, as a whole, may properly be compared and contrasted with operative treatment. It may be accepted that radiotherapy is successful in the treatment of certain cases of myoma of the uterus, and the question now is, What are the relative merits of radiation and operation? The operative mortality in simple cases (for which alone radiotherapy is indicated) is under one per cent. The scar following operation is now not considered of particular moment, and shock of operation is infrequent. There is some nausea and vomiting and discomfort from operation. But taking into account the length of time radiation is necessary and the at present unavoidable after-effects of radiation, which sometimes amount to physical distress for 24 hours, Case estimates that one-third of radiated patients suffer as much as the patients operated upon. The well-known immediate and late post-operative complications have a counterpart in the narrowing of the vagina, which often occurs after radiation, occasional irritation of the skin, intestinal disturbances (diarrhea and rectal tenesmus) and occasionally vesical tenesmus. In a number of cases late injuries to the skin have occurred, sometimes in the form of a malignant ulcer. As to cure, the figures are about 100% for operation, not over ninety for radiation.

A serious difficulty is in determining the presence of an uncomplicated intramural myoma. If this is the condition present there is pretty general agreement that radiation is the treatment of choice. But the error of diagnosis is large, and the impossibility of excluding malignant disease in a certain number of cases presents a definite danger.

The expense is about the same for radiation as for operation.

Case's conclusions are that "only cases of uncomplicated intramural fibroids or cases in which operation is declined or contraindicated by serious organic disease, should be subjected to ray treatment. Possibly there are some extremely neurotic individuals for whom the rays would also be preferable. The ray treatment should not be used when time is a factor, and it cannot be used with safety in rapidly growing tumors, in fibroid complicating pregnancy, or where serious disease exists in the tubes or ovaries. The rays should never be used in any case where complete preliminary curettage with microscopic examination of the curettings is not feasible."

Radium.

Newcomet,[15] in a review of the literature on the use of radium, gives a summary of the results in pelvic disease. Radium appears to be gaining in favor in treating cancer of the cervix uteri, and the number of symptomatic cures, while not large, is increasing. Relief of symptoms, as hemorrhage, discharge and pain, nearly always follows its use. Opinion is divided as to the advisability of operation following radiation. Following operation, radium used judiciously will do no harm, and may do good, and in the case of recurrences should always be used. The disease may symptomatically subside completely. "It must not be forgotten that there are certain individuals who do not show this favorable response to the application of radium, and not a few authors call attention to a certain number in their list who not only fail to respond, but show a decided change for the worse. The radiation of the tissue sometimes causes a more active growth of the disease; and this must be remembered where radium is to be applied to early or borderline cases."

Favorable reports of treatment of benign tumors or myomata have been made by a number of writers, and some take the advanced view that radium should be considered the method of election, and should it fail, as it will in a few, operation for removal can then be considered.

"During the past year a few cases have come under observation where malignant disease followed the removal of a fibroid tumor, and yet operation has been recommended to circumvent this very condition. Had radium been employed previous to the removal, no doubt this sequela would not have occurred." The preferred technic is to dilate the uterine canal, remove a specimen for examination, and insert tube of radium, filtered as needed, in accordance with the amount used.

He concludes that there is very little evidence that radium or any of the radioactive substances will ever be a specific in the treatment of malignant disease, but it has been proved to be a valuable asset in the treatment of individual malignant cases.

Cancer and X-Ray.

Holding[16] considers that improved cancer prognosis is justified by deep roentgen treatment. His conclusions are based on a wide experience with cases of cancer subjected to numerous forms of treatment, and studied in many instances with unusual care. He is inclined to believe, with others, that the morphology of a tumor is related to its resistance to radiation and that embryonal types of tissue are particularly susceptible. For the gynecologist it is interesting to note that Holding regards carcinoma of the uterus and squamous celled epithelioma as lesions which do not respond to x-ray or radium, or give only palliation, and adenocarcinoma of the ovary as a lesion which does respond.

Radium Therapy in Cancer.

Ewing[17] discusses some aspects of radium therapy which deserve attention. His valuable presentation is rather compact and to be appreciated must be read, but he emphasizes the need of scientific criteria in testing radium therapy, and the dangers of its use except in skilled hands. It is in the early stage of its evolution and its actual value should be determined by experts, who are fortified by a knowledge of pathology, as well as by an adequate supply of radium, and skill in the technic of its use.

Cancer of Cervix: Cautery Amputation.

Dickinson[18] advocates a revival of the Byrne cautery method for treatment of cancer of the cervix. He maintains that, for all practical purposes, cases of cancer of the cervix that are curable are curable by cautery amputation. His chief reasons for advocating the older method are its undoubted efficacy in certain cases where the growth is restricted, and the low morbidity and mortality following its use. His view is, therefore, very pessimistic with reference to what operation can accomplish. In order to get a fairer idea of the operation than from his own use of it alone, he visited the clinics, both abroad and in this country, where the extended operation was performed.

The "enlarged Byrne operation" is performed with an electric cautery, of low voltage and high amperage, with a large blade and heavy connecting cables. Good exposure is obtained by means of Schuchardt incision and relatively small retractors. "Two retractors, acting just where the operator is working, usually suffice. Big or water-cooled specula seem to me clumsy and unnecessary." All the paravaginal and paracervical tissue that can be safely removed is taken away, and the cautery incision is prolonged upward into the body of the uterus, removing a cone-shaped mass, including much, if not all, of the endometrium. If the gloved finger is placed in the rectum and the "thermometer or little finger in the bladder," a guide is furnished for deeper work. In certain cases the abdomen is opened and the uterus is held in the gloved hand of an assistant as a control.

It is important to avoid charring. "Cooking ......until the tissue is like horn" is to be desired.

At the end of the operation the cavity is packed with zinc oxide gauze, dusting the vagina and vulva with bicarbonate of soda. The gauze is to be removed only when loose, after a week or more, to avoid secondary hemorrhage. While healing is slow, as suppuration and granulation go on for many weeks, the convalescence is quick, as far as the general strength and getting up are concerned.

Sterilization of Female.

Culbertson[19] describes a new method of sterilization of the human female, which, while thorough, permits the subsequent restoration of fertility, according to his claims.

The broad ligament is punctured from in front backward an inch or so below the round ligament. By pulling up the round ligament a clear space is seen through which the puncture may be made. The fimbriated extremity of the tube is then drawn through the puncture wound and stitched to the peritoneum. The fundus is attached to the anterior abdominal wall (muscle and fascia) by two linen thread mattress sutures which emerge well below the lower end of the incision. One of these sutures on each side of the median line is sufficient. Before the mattress sutures are tied, the round ligament on each side is attached to the anterior abdominal wall from the internal ring to the mattress suture of that side, by a continuous catgut suture. On tying the mattress sutures the peritoneal cavity is divided into an upper and lower portion and the fimbriated extremities are thus completely separated from the ovaries.

The operation has been performed one hundred and twenty-five times with success, but so far no occasion has arisen for attempting restoration of fertility.

Hemorrhage from Ovary.

In the female, intraperitoneal hemorrhage from the pelvis is usually regarded as originating from an ectopic pregnancy. It is well known, however, that it may have some other source and Novak[20] reports one of these unusual cases and briefly reviews the literature.

Novak's patient was an unmarried girl of 15, with normal menstrual history, who was seized suddenly with violent pain in the right iliac fossa, nausea and vomiting. When seen eight hours later there was definite rigidity of the right rectus, pain still localized in the right iliac fossa, and the patient was pale and prostrated. Temperature 99°, pulse 120. By the time the patient could be prepared for operation shock was pronounced, pulse 138, temperature 100°. Blood examination: leucocytes 20,000 with 90% polymorphonuclears, hemoglobin 45%.

At operation the peritoneal cavity contained a large amount of blood. The left tube was normal, except for a bluish dilatation about one centimeter in diameter. The left ovary and right tube were normal, the right ovary showed a small cystic follicle, two and one-half centimeters in diameter, ruptured and containing blood clots which were also adherent to the external surface.

On account of the patient's poor condition operation was limited to suturing the right ovary, removing the left tube and closure of the abdomen. The patient's convalescence was uneventful. Careful microscopical examination of the left tube (F. P. Mall) showed tubal pregnancy, apparently of rather long standing, with no sign of recent bleeding.

About forty similar cases of hemorrhage from the ovary have been reported, some with ruptured ectopic pregnancy, but this seems to be the first noted with unruptured pregnancy.

The point of origin of the bleeding in some of these cases, at least, is the thecal vessels of structures derived from the graafian follicles. It may be from an atretic follicle, but more frequently from a corpus luteum or corpus luteum cyst.

In a number of cases, trauma seems to be a possible factor in the etiology. The principal predisposing factors are conditions which bring about hyperemia of the ovary with engorgement of its vessels, but the histories of the cases reported are too incomplete to determine the relation to menstruation.

The degree of hemorrhage is variable from "two tablespoonfuls" to "cataclysmic," as in some fatal cases.

The diagnosis generally made before operation is acute appendicitis, as in Novak's case, or ectopic pregnancy. A correct diagnosis is difficult and may be impossible.

Pharmacology of the Vagina.

Waddell[21] reports the results of a study of the "pharmacology of the vagina." The excised organs of non-pregnant nulliparous and multiparous animals were used for experiment of dogs, cats, rabbits, rats, guinea pigs, cows, sheep and hogs. The drugs employed were epinephrine, nicotine, arecoline, physostigmine, pilocarpine, atropine, scopolamine, ergot, hydrastis, ergotoxine, morphine, cocaine, pituitary extract and barium chloride. They were examined with reference to their effects on both the longitudinal and the transverse sections of the vaginae of one or all of the above mentioned species.

He finds that spontaneous rhythmic contractions are exhibited by both the circular and longitudinal musculatures of the excised vaginae, when suspended in oxygenated Tyrode's solution at body temperature. The application of drugs produces on the circular musculature the same response as on the longitudinal. There are numerous other interesting findings, the practical value of which is not yet clear, but it is especially interesting to note that the excised vagina of the non-pregnant animal reacts to drugs in most cases like the uterus of its species.

Tissue Tone.

Huggins[22] calls attention to the fact that there is at present no way of determining what he calls the "horse power" of the patient to be subjected to operation. Independent of somewhat obvious contra-indications to operation, such as damaged kidneys or lungs, and marked cardiac disease, there is a condition which is characterized by poor tone throughout the entire muscular system, including the heart, which is most difficult to measure. Careful study suggests a flabby heart. If this condition of flabbiness seems present throughout the body it is of great prognostic importance. The condition may best be described as one of chronic fatigue, and the strain of a major operation may be more than the patient can stand.

Many causes operate to bring on this condition of reduced vitality which is an important factor often overlooked. Suitable rest and building up of the patient perhaps for several weeks before operation may make the difference between recovery and death to the patient.

Determination of the presence of this reduced vitality may tax the diagnostic skill of the surgeon. The reaction of the heart to graduated exercise, as indicated by the change in pulse pressure, Huggins considers a valuable indication. If exercise diminishes the pulse pressure markedly, operation is unsafe or distinctly contraindicated. A functional kidney test should not be neglected and the electrocardiogram may reveal suspected disease.

There is another danger signal for the gynecologist to which Huggins calls attention. It is the occurrence of loss of tissue tone and flabby heart muscle with prolapse of the uterus, a coincidence which Huggins now regards as ominous. It is particularly true when the prolapse develops suddenly, the patient seeking relief a few weeks from its onset. The predisposing factors following the trauma of childbirth have been present for years, but suddenly, for no well defined reason, the uterus becomes prolapsed to the second or third degree.

Huggins reports three deaths following operation for relief of uterine prolapse. In the first the clinical diagnosis of the cause of death was weakness of the muscular structure of the heart, and of the intestines as well. In the second, it was paralytic ileus. In the third, about two weeks after operation, the patient began to complain of some shortness of breath and dyspnea when talking. After several days the patient died suddenly without any aggravation of these symptoms. There were no necropsy reports.

Huggins' paper is a plea for a more careful study of the patient's general condition before undertaking a major operation, and an attempt to improve the condition by rest and general building up. If the patient does not respond to this treatment the advisability of operation becomes doubtful, at least.

Pulmonary Fat Embolism.

Bissell's[23] study of fat embolism as a cause of postoperative death is a valuable contribution. His conclusions are as follows: (1) Deaths clinically supposed to be due to surgical shock are due, in so far as this experience goes, to pulmonary fat embolism and its attendant blood pressure phenomena. (2) Pulmonary fat embolism causes a lowering of arterial blood pressure and an elevation of venous blood pressure, which may be sufficient to cause death. (3) Intravenous infusions are contraindicated because of the increased pressure on the right heart.

(4) By simple methods pulmonary fat embolism is easily demonstrated at necropsy.

In eight months six instances of fatal post-operative fat embolism were observed in the necropsy service of the Mayo Clinic. Three followed breast amputation, one ventral herniotomy, one craniotomy for brain tumor, and one laminectomy for spinal cord tumor. Three of these cases, herniotomy and two breast amputations, are reported in detail. The microphotographs give striking pictures of extensive accumulation of fat in the lungs. While the sub-title of the paper, "a frequent cause of post-operative death," should be regarded as an opinion rather than as a conclusion legitimately drawn from the evidence submitted, the evidence does show that perhaps fat embolism in the obese or following operations in fatty tissue with considerable trauma is a very serious danger, for it sometimes causes death. The susceptibility of the obese to shock has long been recognized, and Bissell has shown the anatomical basis for clinical manifestations so well described years ago by Roswell Park. Park's conclusions are worthy of repetition now. He said:

"1. Fat embolism in varying degrees of severity is not an uncommon complication of surgical accidents and operations.

"2. It may be so mild as to be lost sight of in the general condition of shock, or, perhaps, more properly speaking, it is one factor of a condition of prolonged shock.

"3. Our knowledge of the subject will be greatly increased when we appreciate the possibilities of its occurrence and observe our cases more closely, watching for the appearance of fat in the urine, or slight dyspnea, etc.

"4. When prostration and loss of blood have been great, a moderate amount of embolic disturbance of this kind may serve to turn the scales against a patient who would have otherwise recovered.

"5. By a proper understanding of this subject, certain deaths may be explained which otherwise seem inexplicable.

"6. Treatment can be only symptomatic, but may accomplish something.

"7. Autopsies should be so conducted as to reveal this condition when present."

REFERENCES.

[1] Frank: Surg., Gyn. and Obst., Nov., 1917, No. 5., p. 538.
[2] Ward: Surg., Gyn. and Obst., Vol. xxv, No. 2, p. 126.
[3] Peterson: Surg., Gyn. and Obst., Oct., 1917, Vol. xxv, No. 4, p. 391.
[4] Pollock: Med. and Surg., 1917, Vol. i, p. 182.
[5] Williams: Med. and Surg., 1917, Vol. i, p. 188.
[6] Elkin and Haythorn: Surg., Gyn. and Obst., Vol. xxv, p. 51; Vol. xxv, p. 72.
[7] Boldt: Jour. A. M. A., 1917, Vol. xviii, p. 832.
[8] Clark and Norris: Surg., Gyn. and Obst., Vol. xxv, No. 1, p. 33.
[9] Cullen: Surg., Gyn. and Obst., 1917, Vol. xxv, No. 2, p. 134.
[10] Miller: Surg., Gyn. and Obst., 1917, No. 4, p. 431.
[11] Goetsch: Surg., Gyn. and Obst., Sept., 1917, p. 229.
[12] Pancoast and Hopkins: N. Y. Med. Jour., 1917, Vol. cv, p. 289.
[13] Loeb: Surg., Gyn. and Obst., Sept., 1917, No. 3, p. 300.
[14] Case: Surg. Clin. Chicago., 1917, Vol. i, p. 579.
[15] Newcomet: Surg., Gyn. and Obst., Sept., 1917. Collect review.
[16] Holding: Am. Jour. Roent., 1917, Vol. iv, p. 183.
[17] Ewing: Jour. A. M. A., 1917, Vol. lxviii, p. 1238.
[18] Dickinson: Am. Jour. Obst., 1917, Vol. lxxv, p. 737.
[19] Culbertson: Surg. Clin., Chicago, 1917, Vol. i, p. 519.
[20] Novak: Jour. A. M. A., 1917, Vol. lxviii, p. 1160.
[21] Waddell: Jour. Pharmacology and Exp. Thera., 1917, Vol. ix, p. 411.
[22] Huggins: Am. Jour. Obst., 1917, Vol. lxxv, p. 545.
[23] Bissell: Surg., Gyn. and Obst., 1917, Vol. xxv, No. 1.

Book Reviews.

Pocket Formulary. By E. Quin Thornton, M.D. Eleventh edition. Revised. Philadelphia and New York: Lea and Febiger. 1918.

This is the eleventh edition of a most useful formulary, which has been revised in accordance with recently developed knowledge of the value of salvarsan, human blood serum, antimeningitis serum, curative sera of all kinds, bacterial vaccines, etc. The work is not a mere collection of prescriptions. There has been an earnest endeavor to summarize the best therapeutic knowledge of the day, excluding no drug on account of its age, and including none by reason of its novelty. The text has been arranged in the most convenient fashion possible. Diseases are arranged alphabetically, and under each are given what are believed to be the most efficacious prescriptions for simple cases as well as for the various stages and complications. A valuable feature of the work is found in the annotations as to the use of each formula.

Lectures on Medicine—A Handbook for Nurses. By Chalmers Watson, M.D., F.R.C.P.E. New York: William Wood and Company. 1918.

This book consists of a series of clinical lectures for nurses, written by the Lecturer on Clinical Medicine of Edinburgh University. An attempt has been made to present an epitome of the principles and practice of medicine in a form appropriate to nurses. The purpose of the book is to increase the nurse's medical knowledge so that she may be able to render as much assistance as possible to the physician in the investigation of the less known diseases, and to secure her intelligent and effective coöperation in the management and care of her patients. The major disorders of the human system are analyzed, symptoms described, illustrative examples given, and general treatment outlined. A chapter is devoted to dietation for various kinds of diseases, and a collection of sick-room recipes given.

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MEDICAL RESERVE CORPS.

THE following self-explanatory letter has been received from Surgeon-General Gorgas:

War Department,
Office of the Surgeon-General,
Washington, April 8, 1918.

"1. I wish to call to the attention of the profession at large the urgent need of additional medical officers. As the war progresses the need for additional officers becomes each day more and more apparent. Although the medical profession of the country has responded as has no other profession, future response must be greater and greater. The Department has almost reached the limit of medical officers available for assignment.

2. I am, therefore, appealing to you to bring to the attention of the profession at large the necessity for additional volunteers. So far the United States has been involved only in the preparatory phase of this war. We are now about to enter upon the active, or the fighting phase,—a phase which will make enormous demands upon the resources of the country. The conservation of these resources, especially that of man-power, depends entirely upon an adequate medical service. The morning papers publish a statement that by the end of the year a million and a half of men will be in France. Fifteen thousand medical officers will be required for that army alone. There are today on active duty 15,174 officers of the Medical Reserve Corps.

3. Within the next two or three months the second draft will be made, to be followed by other drafts, each of which will require its proportionate number of medical officers. There are at this time on the available list of the Reserve Corps, an insufficient number of officers to meet the demands of this draft.

4. I cannot emphasize too strongly the supreme demand for medical officers. Will you give the Department your assistance in obtaining these officers? It is not now a question of a few hundred medical men volunteering for service, but it is a question of the mobilization of the profession, that in the large centers of population and at other convenient points, as well as at all Army camps and cantonments, boards of officers have been convened for the purpose of examining candidates for commission in the Medical Reserve Corps of the Army. An applicant for the Reserve should apply to the board nearest his home.

5. The requirements for commission in the Medical Reserve Corps are that the applicant be a male citizen of the United States, a graduate of a reputable school of medicine, authorized to confer the degree of M.D., between the ages of 22 and 55 years, and professionally, morally and physically qualified for service.

W. C. GORGAS.
Surgeon-General, U. S. Army."

In conjunction with the appeal from Major Simpson, published in last week's issue of the JOURNAL, the importance of this communication from General Gorgas is obvious. The seriousness of the present war-crisis in Europe makes it imperative to hasten the dispatch of troops, and the raising of further draft armies, from this country. This means more medical officers urgently needed in the Army and the Navy at home and abroad. The time has come when every physician, within the age-limits, should, if humanly practicable, offer himself for service to his country in whatever professional capacity he can be most expediently employed.

ANNUAL REPORT OF THE CANCER COMMISSION OF HARVARD UNIVERSITY.

The fifth annual report of the Collis P. Huntington Memorial Hospital and the Cancer Commission of Harvard University has been submitted for the year ending June 30, 1917. Since the Commission first decided to expand its work from that made possible by the Croft bequest to a larger field of usefulness, it has obtained funds which have enabled it to build and conduct a hospital of twenty-five beds for a period of about five years, and to establish a plant which now represents a valuation of about six hundred thousand dollars, and involves an annual expenditure of nearly fifty thousand dollars. With these funds it has been enabled, not only to support the hospital, but to conduct investigations into the origin and treatment of cancer. For this purpose the Commission has organized a hospital staff, consisting of experts in the care and treatment of the disease. It has also brought together a group of scientific investigators engaged in research into the problems which the progress of the work brings forward from time to time for solution.

The most recent activities of the Commission have been concerned with the problems which the discovery of radium and other forms and applications of light rays have brought into prominence. Under the supervision of Prof. William Duane, there has been conducted for the past five years a systematic study of the action of light rays upon cancer, and their incidental effects upon normal tissues. Professor Duane's work has been chiefly concerned in the perfection of a method of obtaining the "emanation" from radium in a pure state, and preparing it in a form serviceable for therapeutic purposes. Dr. W. T. Bovie's research work on the action of rays of light upon the living cell in a state of active division has a most important bearing upon the underlying conditions of cancer and growth in general.

The Commission has suffered from the loss of active workers, who have been called into the service of a country at war. Many valuable investigations have been curtailed for this reason.

The amount of radium in the possession of the Commission has more than doubled during the past year, and now amounts to one gram, representing a value of about one hundred thousand dollars.

The expansion of the work of the Commission has shown the importance of the construction of a new building or annex to the Hospital, specially designed for this original work. The Hospital itself has a constantly increasing service, and the large number of out-patients calls for additional accommodations. Designs are being prepared for an addition, where the valuable radium plant, a new x-ray machine, and specialized chemical laboratories can be suitably housed.

During the year plans have been made to supply the State of Massachusetts with what is called a Free Diagnosis Service. One of the difficulties in obtaining accurate statistics of cancer is due to the frequent lack of accurate pathological investigation of the supposed cancer tissue. A microscopic examination by a competent authority is often wanting. The Commission has, therefore, planned to supply this service for the physicians and hospitals of Massachusetts, to whom it is not otherwise available. Such aid from the Commission cannot fail to be of great practical value to the State in favoring the early recognition and the effective treatment of cancer. Too much stress cannot be laid upon the importance of the fact that it is in its early stages that cancer is a curable disease.

The work of the Commission has shown during the past year that a slow but steady progress is being made towards the solution of the proper method of treating cancer. No panacea has yet been discovered, but a backward glance gives ample evidence that much has been accomplished. In the more superficial forms of the disease, such as are seen so frequently on the face, many cures are effected by radium, and in some of the internal forms of malignant disease the results of radiotherapy are encouraging.

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METHODS FOR FIELD STUDY OF INDUSTRIAL FATIGUE.

From the Public Health Report for March 15, 1918, comes an interesting statement concerning industrial fatigue investigation. Field investigation into industrial fatigue means investigation carried out in the factory itself, where fatigue is produced by ordinary work, as contrasted with experiments carried on in the laboratory, where fatigue is produced artificially. These field investigations fall into two classes,—investigations which measure ordinary natural fatigue by means of artificial "tests," such as tests of reaction time or tests of sense acuity, and investigations which measure fatigue by the ordinary events of industrial life, such as output (quantity and quality), accidents, power consumption, sickness, labor turnover. The most usual measure to take is that of quantity of output, wherever this does not depend exclusively on the speed of the machine. The data of the investigator are here either found ready for him in factory records kept for purposes of checking wages or measuring efficiency, or the investigator may observe and record the industrial processes himself.

The test of the "hourly output curve" is a new and successful method of testing fatigue. The output of a certain number of machines is observed from one to seven days each, and the output for each hour (8 to 9, 9 to 10, etc.), added up in a total, 10 working hours being compared. Fatigue consists in a diminution of activity that is itself caused by activity. As activity proceeds activity falls, and the theory is that a comparison of the output of consecutive hours will show exactly to what extent the unrelaxed tension of activity will result in fatigue toward the end of a spell and toward the end of the working day, and exactly how far rest pauses, meal intervals, and a night's sleep will allow human capacity to gain recovery.

There are several advantages of the hourly output test. The record of the output is usually easy to secure every hour. Foremen often keep it for their own benefit in estimating at any given time how the day's work is progressing. Often there are automatic registers on machines which record the hourly output. The output curve can be accompanied by curves in other very significant events of factory life, as accidents and the consumption of power. The evidence of fatigue cannot be judged from the number of accidents and the amount of electrical power consumed except by hourly curves. By comparison of the curve of output with the curves of accident and power consumption, measured by hours, a very accurate gauge of fatigue in the factory may be obtained. The hourly curve brings out the subtle distinction between the fatiguing effect of different types of work and possibly of different types of conditions also. It has been demonstrated that monotonous work—work requiring attention and work involving muscular strain—might yield curves of different shapes.

There is one disadvantage of the hourly curve method. It does not make clear just what conditions are wrong. If an output or power consumption curve should fall or an accident curve rise steeply, conditions are obviously wrong, but what conditions may lead to better results is not directly indicated by the figures. If a sufficient number of observations are made, however, comparisons between factories are made possible. If the output curve in one factory drops heavily as the work increases in length, while in another factory on the same operation the output curve continues steadily, then we may conclude that the latter factory has so arranged its hours and conditions of work that the workers do not suffer from undue fatigue at the end of their day.

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THE PRESENT SMALLPOX SITUATION.

The Monthly Bulletin of the Health Department of Boston for February states that smallpox has been very prevalent in the United States this season. Comparatively few cases have been discovered in Massachusetts, but a widespread epidemic has prevailed in Maine. Several cases were discovered in Boston early in December. They occurred in well-to-do individuals, and exposed a large number of people to the danger of infection before the nature of the disease was recognized. Every agency at the command of the Health Department was promptly employed to locate exposed persons, vaccinate them, and keep them under observation, but it was impossible to locate them all. All the cases had traveled extensively about the city while in a contagious stage of the disease, and had exposed other persons to infection in street cars, restaurants, and barber shops. Investigation showed that these cases of smallpox must have been contracted in Boston or vicinity from other cases of smallpox which were never discovered. A few more cases of smallpox have since been discovered in or about Boston, all but one of which were attributable to infection from undiscovered local cases. The one exception occurred in an individual who had been kept under supervision of the Health Department after known exposure to another case.

The Health Department wishes to make public the danger from smallpox. Persons who have not been vaccinated within seven years are advised to be vaccinated. Over 50,000 persons have already been vaccinated, including especially the class of people among whom cases of smallpox have occurred, the well-to-do, those whose business takes them into other States, and those whose occupations bring them into close contact with persons coming into the city from elsewhere, employees of transportation companies, hotels, department stores and other large corporations. This vaccination may have helped Boston to avoid the outbreak of a serious epidemic of smallpox during the winter. Physicians have been on the lookout for symptoms of smallpox, and actual cases of the disease have been promptly recognized and treated. The prevalence of smallpox in other parts of the country presents a danger to Boston which is not to be disregarded. Everyone familiar with conditions in Boston knows that the city is ripe for a serious smallpox epidemic, even though it may be escaped this year. Boston has an unusually large unvaccinated population. The last outbreak occurred in 1901-02, when there were 1528 cases reported, with 190 deaths. Whether Boston is going to see a repetition of one of these epidemics will depend upon the people themselves, upon the extent of their willingness as individuals to adopt well-recognized measures for personal self-protection.

The highest number of cases of smallpox officially reported in the United States from October 1, 1917, to January 20, 1918, occurred in the following states:

Ohio	2755
Nebraska	1974
Indiana	1722
Michigan	1672
Kansas	1370
Iowa	1140

The fewest cases were reported in the following States:

Massachusetts	12
Vermont	9
Connecticut	6
Nevada	2

THIRD ANNUAL REPORT OF THE FORSYTH DENTAL INFIRMARY.

The Third Annual Report of the Forsyth Dental Infirmary for Children was presented in January, 1918. This Infirmary was founded in 1910, and aims to educate parents, teachers, nurses, and children in the hygienic value of healthy mouths, and to furnish instruction as to the best methods of securing the same; to prevent dental caries by oral prophylaxis and by the care and preservation of the temporary teeth; to investigate the causes and to study the prevention of oral diseases and caries of the teeth; to remedy, so far as possible, existing conditions of dental caries and other oral diseases; to establish and promulgate a higher standard of dental asepsis; to furnish for the dental profession an opportunity for charitable work and for the educative experience of a large clinic.

In accordance with these aims, the Infirmary has pursued its work, and reports that in 1917 a larger number of patients have been cared for than ever before, this being due largely to the coöperation of all members of the Infirmary staff. School nurses have also helped very much in bringing to the Infirmary various groups of children in need of dental care. At the request of schools and societies, lectures have been given to parents, children and others in regard to the work of the Infirmary and the importance of caring for the teeth of young children.

There have been about one thousand visitors at the Infirmary throughout the year, many of whom remained several days to study methods of operating and treating the children. Several have operated for ten days or more in the Infirmary clinics.

With the declaration of war, a letter was sent to President Wilson, offering to the Government the use of the Infirmary with its facilities and equipment. The President replied, expressing his cordial thanks, and saying that he was bringing the offer to the attention of the Secretary of War.

Following this response of the President, action was taken to organize the staff to operate at the Infirmary in case it should be accepted as a base hospital for the treatment of face and jaw injuries. This staff is under the direction of a general surgeon as chief, and represents a complete unit dealing with plastic surgery, bone grafting, treatment of fractured jaws, making of special appliances, oral and dental surgery, and contemplates the installation of three to five hundred beds, with the requisite number of assistants, nurses, etc.

Three one-week courses were organized the latter part of May at the Infirmary to fit dentists for service in the Dental Officers' Reserve Corps; about six hundred dentists were registered for these courses, with daily session from 9 a.m. to 7 p.m. Dr. Harold DeWitt Cross, the Director of the Infirmary, was appointed Preliminary Dental Examiner for the D.R.C., and after the courses were completed, physical and professional examination for appointments in the corps were held at the Infirmary, over three hundred dentists being examined.

Much emphasis has been laid on the desirability of treating children of a very young age to obtain the full benefit of preventive dentistry. It has been the policy of the Infirmary to encourage the attendance of very young children, with the object of increasing preventive rather than reparative work. The result has been that the number of such children receiving oral treatment is exceeded by no other institution in the world. The plan has been adopted of requiring that the majority of the cases coming to the Infirmary should not be more than eight years of age, for the wisdom of the policy of giving attention to the children prior to the destruction of their six-year molars and of eliminating very badly involved teeth has been fully demonstrated.

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SCHOOL OF INSTRUCTION ON PUBLIC HEALTH.

The program for the Convocation and School of Instruction on Public Health, to be given by the Committee on Public Health of the Massachusetts Medical Society, is nearing completion. It is expected that special sessions will be devoted to such topics as water, sewage, public health laboratory methods, public health reports, specific diseases, industrial hygiene, child welfare and public health administration. The program for Thursday, May 30, will include an address by Past Assistant Surgeon A. J. Lanza of the U. S. Public Health Service. Dr. Lanza has been the officer in charge of the investigation of industrial sanitation. The Public Health Service is coöperating with the Committee on Public Health in arranging for this School, and it is through the courtesy of Surgeon-General Rupert Blue that Dr. Lanza's presence is made possible.

On the evening of May 30, an illustrated lecture on "Public Health Education in China" will be given by Dr. W. W. Peter, whose work in China was described in such flattering terms in the February issue of *World's Work*. Dr. Peter has been in charge of public health education in China for some years. For the past year he has been studying public health methods in this country, and expects to return to Shanghai in August. The lecture will be held at the new Technology Buildings. Ladies are invited, and during the social hour which is to follow the lecture there will be an opportunity to meet Dr. and Mrs. Peter.

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MEDICAL NOTES.

London Death Rates in 1917.—Statistics recently published show that the total death rate of London during the year 1917 was only 14.7 per thousand inhabitants living. Among the several districts and boroughs, the highest annual rate was 19.5 in Shoreditch, a crowded East Side slum, and the lowest was 10.9, in the financial and business region of the city.

Annual Report of the New Jersey State Hospital.—The forty-second annual report of the New Jersey State Hospital for the Insane, at Morris Plains, N. J., has been submitted for the period from November 1, 1916, to October 31, 1917, and the needs of the institution for the coming year therein set forth. The hospital has suffered seriously from overcrowding during the past year, having 2685 patients in residence at the close of the year, with a normal capacity of about 1650, and with every reason to expect the usual annual increase in population. In order to treat and care for the insane successfully, it is necessary to house them in such a manner as best to promote their restoration to health, and to make those in whom recovery is impossible comfortable, and this is out of the question where overcrowding exists. The year, from a financial standpoint, has been a strenuous one, presenting problems of great perplexity. All commodities of necessity and up-keep have soared in cost, with no relaxation in the demands for feeding and clothing, and supplying the necessary facilities indispensable to the proper conduct of the hospital. It has been impossible to command sufficient officers, nurses and attendants and such help as is needed in the various divisions of the medical and business departments to protect properly the cardinal necessities of the institution. The nursing corps has been sadly deficient, almost continuously threatening the safety of the sick, while the medical staff lacks five members to make it complete and in reasonable working order.

WAR NOTES.

Promotions in the Medical Reserve Corps.—Eleven captains in the Medical Reserve Corps have been promoted to be majors. They are: Capt. Edward C. Green, Cambridge, 301st Engineers; Capt. Charles A. Barron, Philadelphia, 301st Field Hospital; Capt. Robert J. Carpenter, North Adams, 301st Ambulance Company; Capt. T. H. Dexter, Brookline, 303d Field Hospital; Capt. W. J. Collins, Northampton, 304th Field Hospital; Capt. H. A. Lamphear, Fitchburg, 304th Infantry; Capt. D. M. Unger, New York, Depot Brigade; Capt. B. M. Cort, Springfield, 302d Ambulance Company; Capt. C. T. Congdon, Nashua, Depot Brigade; Capt. John J. Murphy, Cambridge, 302d Infantry; Capt. James J. Powers, Manchester, N. H., 302d Infantry.

A New Review on War Surgery.—There has just been prepared in the Office of the Surgeon-General a new pamphlet Review of War Surgery and Medicine (March, 1918, Vol. i, No. 1). According to the editorial note, this review is to appear monthly and to be devoted to abstracts of war medical literature. This little pamphlet will furnish the medical personnel of the Army abstracts of original papers of importance, necessary information in a short compass, and prompt publication of reports which otherwise might not gain circulation.

In this first volume there is an excellent review of Surgery in the Zone of Advance, prepared from data written by Major George de Tarnowsky, based upon his personal observations in the French army front. It is the best description that has yet appeared in American literature of the war.

This is followed by a very readable and instructive review of the most recent data on gas gangrene, trench foot and the general principles guiding the treatment of wounds of war.

Copies of this review may be obtained by addressing the Superintendent of Documents, Government Printing Office, Washington, D. C., enclosing ten cents in stamps.

This review should be in the hands of every officer of the Medical Corps and should be of interest to the entire medical profession not in the service. The reviews are very well written and make most interesting and profitable reading.

The Good Samaritan Function of the Medical Corps.—Major George de Tarnowsky, M.O.R.C. (*Review of Surgery and Medicine*, March, 1918, Vol. i, No. 1, prepared in the office of the Surgeon-General) gives one of the best descriptions of the surgery in the zone of advance, from personal observations on the French front. Attention of all medical officers is directed to the following:

"In addition to hot meals which are carried to the soldiers in the trenches, the Medical Corps now sends hot tea, flavored with a small amount of brandy, to the front lines twice daily—a most welcome potion, which the soldiers look forward to with eagerness. The prevailing idea of the French Medical Corps is to make the fighting men feel and know that their comfort is being looked after and that everything is being done to mitigate the hardships under which they live. The French are strong believers in the personal element—the little acts of kindness, even of tenderness, towards the individual soldier which have helped to keep up both his fighting spirit and his mental serenity. The 'tisaneries,' as the hot tea stations are called, did not come into existence as the result of army orders; they represent a voluntary contribution to the soldier on the part of the Medical Corps. Begun in a small way, it was soon noticed that, where the *tisaneries* existed and the regimental kitchens were installed near enough to the trenches so that the food reached the soldier hot, the morale and fighting edge were of the finest."

BOSTON AND MASSACHUSETTS.

Week's Death Rate in Boston.—During the week ending April 13, 1918, the number of deaths reported was 268, against 268 last year, with a rate of 17.82, against 18.09 last year. There were 41 deaths under one year of age, against 45 last year.

The number of cases of principal reportable diseases were: diphtheria, 70; scarlet fever, 24;

measles, 321; whooping cough, 43; typhoid fever, 3; tuberculosis, 60.

Included in the above were the following cases of non-residents: diphtheria, 21; scarlet fever, 4; measles, 6; whooping cough, 3; typhoid fever, 1; tuberculosis, 5.

Total deaths from these diseases were: diphtheria, 7; measles, 6; whooping cough, 5; tuberculosis, 34.

Included in the above were the following non-residents: diphtheria, 2; measles, 2; tuberculosis, 2.

ANNUAL REPORT OF THE BOSTON ASSOCIATION FOR THE RELIEF AND CONTROL OF TUBERCULOSIS.—The fourteenth annual report of the Boston Association for the Relief and Control of Tuberculosis for 1917 contains the following information concerning the work for the past year. The Association has been much affected by the war, especially by the fact that the Secretary has been granted leave of absence to take up the work of the Boston Committee on Training Camp Activities. The active work of the Association in educating the public through the Park Shows has been discontinued, as was the work of the Healthgram Committee throughout the summer. The Prendergast Camp has continued doing good work, caring for those who are on the waiting list for some sanatorium, and caring for those who have been discharged from the state sanatoria and cannot find elsewhere the opportunity to continue regular rules for living. The work of the Committee on Health in Industry has been most encouraging, and report is made that the attitude of many manufacturers, which was at first doubtful or actively hostile, has changed to one of interest and even coöperation. Boston, as well as the State at large, has had an increase both in its number of deaths throughout the year and also in the actual number of reported deaths grom tuberculosis. The increase is probably due to greater truth in diagnosis and a better system of reporting. Reports made after investigation by the Boston Department of Health show that there are practically no neglected cases of tuberculosis in the community. At the Mattapan Hospital the Association has attempted to make a start in providing entertainment for the patients. It is extremely necessary that tuberculosis hospitals should furnish a certain amount of recreation to the people who are there. One cannot realize the lonesomeness and depression, even desperation, that must come to people who are obliged to spend weeks and months in an institution with its small opportunities for recreation and change of thought. One does not wonder that patients often become discontented and unhappy, and anything that can be done to relieve the monotony of their existence will do much to make the institution popular with the masses. It behooves anyone at all interested in the subject of tuberculosis to do something to help the hospitals by sending fruits, flowers, magazines,—or, best of all, making some personal visitation.

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The Massachusetts Medical Society.

NOTES FROM THE DISTRICT SOCIETIES.

DISTRICT CORRESPONDENTS.

Berkshire, A. P. MERRILL, M.D., Pittsfield.
Bristol North, ARTHUR R. CRANDELL, M.D., Taunton.
Bristol South, EDWIN D. GARDNER, M.D., New Bedford.
Essex North, T. N. STONE, M.D., Haverhill.
Essex South, H. P. BENNETT, M.D., Lynn.
Hampden, LAURENCE D. CHAPIN, M.D., Springfield.
Hampshire, E. E. THOMAS, M.D., Northampton.
Middlesex South, WILLIAM C. HANSON, M.D., Belmont.
Norfolk South, DANIEL B. REARDON, M.D., Quincy.
Plymouth, ALFRED C. SMITH, M.D., Brockton.

MIDDLESEX SOUTH DISTRICT MEDICAL SOCIETY.—At a special meeting of the Middlesex South District, on March 22, 1918, the following recommendations submitted by the Committee on War Relief were adopted:

First, That a War Relief Committee, consisting of the president, secretary and treasurer, be established, whose duty it shall be to raise, manage and distribute a fund for the relief of those enlisted members and their dependents that may need such aid during the war.

Second, Such fund is to be raised by voluntary contributions of the profession and the public in such manner as may be determined by the Committee.

Third, Each member of the Society shall be notified of the existence and object of this War Relief Committee. It is to be hoped that the members will call the attention of the Committee to any person or persons who, in their judgment, may need such assistance as is intended in this act.

Committees have been appointed for each district of the Middlesex South Society, and all members will be given the privilege of subscribing to the fund in the near future.

The Society voted, in the interest of economy, to omit the annual dinner this year.

Our secretary, Dr. Lyman S. Hapgood, has enlisted for the duration of the war with Dr. Lund's unit which is now stationed at a base hospital at Camp Wheeler, Macon, Georgia.

William C. Hanson,
District Correspondent.

Miscellany.

SUGGESTIONS FOR STATE BOARD OF HEALTH REGULATIONS.

Approved by the Surgeon-General of U. S. Army, Navy, and Public Health Service.

(To be published shortly in P. H. S. *Weekly Reports.*)

Regulations of the . . . State Board of Health for the prevention of venereal diseases. (Adopted . . . 19. .)

Venereal Diseases Declared Dangerous to the Public Health.

Syphilis, gonorrhea and chancroid, hereinafter designated venereal diseases, are hereby declared to be contagious, infectious, communicable, and dangerous to the public health.

Rule 1. Venereal Diseases to be Reported.

Any physician or other person who makes a diagnosis in, or treats, a case of syphilis, gonorrhea or chancroid, and every superintendent or manager of a hospital, dispensary, or charitable or penal institution, in which there is a case of venereal disease, shall report such case immediately in writing to the local health officer, stating the name and address or the office number, age, sex, color, and occupation of the diseased person, and the date of onset of the disease, and the probable source of the infection, provided that the name and address of the diseased person need not be stated except as hereinafter specifically required. The report shall be enclosed in a sealed envelope and sent to the local health officer, who shall report weekly[*] on the prescribed form to the State Board of Health, all cases reported to him.

Rule 2. Patients to be Given Information.

It shall be the duty of every physician and of every other person who examines, or treats a person having syphilis, gonorrhea, or chancroid, to instruct him in measures for preventing the spread of such disease, and of the necessity for treatment until cured, and to hand him a copy of the circular of information obtainable for this purpose from the State Board of Health.

Rule 3. Investigation of Cases.

All city, county, and other local health officers shall use every available means to ascertain the existence of, and to investigate, all cases of syphilis, gonorrhea and chancroid within their several territorial jurisdictions, and to ascertain the sources of such infections. Local health officers are hereby empowered and directed to make such examinations of persons reasonably suspected of having syphilis, gonorrhea or chancroid, as may be necessary for carrying out these regulations. Owing to the prevalence of such diseases among prostitutes and persons associated with them, all such persons are to be considered within the above class.

Rule 4. Protection of Others from Infection by Venereally Diseased Persons.

Upon receipt of a report of a case of venereal disease, it shall be the duty of the local health officer to institute measures for the protection of other persons from infection by such venereally diseased person.

(*a*) Local health officers are authorized and directed to quarantine persons who have, or are reasonably suspected of having, syphilis, gonorrhea, or chancroid, whenever in the opinion of said local health officer, or the State Board of Health, or its secretary, quarantine is necessary for the protection of the public health. In establishing quarantine the health officer shall designate, and define the limits of, the area in which the person known to have, or reasonably suspected of having, syphilis, gonorrhea, or chancroid, and his immediate attendant, are to be quarantined, and no persons, other than the attending physicians, shall enter or leave the area of quarantine without the permission of the local health officer.

No one but the local health officer shall terminate said quarantine, and this shall not be done until the diseased person has become noninfectious, as determined by the local health officer or his authorized deputy through the clinical examination and all necessary laboratory tests, or until permission has been given him so to do by the State Board of Health or its secretary.

(*b*) The local health officer shall inform all persons who are about to be released from quarantine for venereal disease, in case they are not cured, what further treatment should be taken to complete their cure. Any person not cured, before release from quarantine, shall be required to sign the following statement after the blank spaces have been filled to the satisfaction of the health officer:

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[*] Substitute period required for other communicable diseases.

I, . . . , residing at . . . ; hereby acknowledge the fact that I am at this time infected with . . . ; and agree to place myself under the medical care of . . . (name of physician or clinic), . . . (address) within . . . hours, and that I will remain under treatment of said physician or clinic until released by the health officer of . . . or until my case is transferred with the approval of said health officer to another regularly licensed physician or an approved clinic.

I hereby agree to report to the health officer within four days after beginning treatment as above agreed, and will bring with me a statement from the above physician or clinic of the medical treatment applied in my case, and thereafter will report as often as may be demanded of me by the health officer.

I agree, further, that I will take all precautions recommended by the health officer to prevent the spread of the above disease to other persons, and that I will not perform any act which would expose other persons to the above disease.

I agree, until finally released by the health officer, to notify him of any change of address and to obtain his consent before moving my abode outside his jurisdiction.

(Signature.)

(Date.)

All persons signing the above agreement shall observe its provisions, and any failure to do so shall be a violation of these regulations. All such agreements shall be filed with the health officer and kept inaccessible to the public as provided in Rule 10.

Rule 5. Conditions under Which the Name of a Patient is Required to be Reported.

(*a*) When a person applies to a physician or other person for the diagnosis or treatment of syphilis, gonorrhea, or chancroid, it shall be the duty of the physician or person so consulted to inquire of, and ascertain from, the person seeking such diagnosis or treatment, whether such person has theretofore consulted with, or has been treated by, any other physician or person, and if so, to ascertain the name and address of the physician or person last consulted. It shall be the duty of the applicant for diagnosis or treatment to furnish this information, and a refusal to do so, or a falsification of the name and address of such physician or person consulted by such applicant shall be deemed a violation of these regulations. It shall be the duty of the physician or other person whom the applicant consults to notify the physician or other person last consulted of the change of advisers. Should the physician or person previously consulted fail to receive such notice within ten days after the last date upon which the patient was instructed by him to appear, it shall be the duty of such physician or person to report to the local health officer the name and address of such venereally diseased person.

(*b*) If an attending physician or other person knows, or has good reason to suspect that a person having syphilis, gonorrhea, or chancroid is so conducting himself or herself as to expose other persons to infection, or is about so to conduct himself or herself, he shall notify the local health officer of the name and address of the diseased person and the essential facts in the case.

Rule 6. Druggists Forbidden to Prescribe for Venereal Diseases.

No druggist or other person not a physician licensed under the laws of the State shall prescribe or recommend to any person any drugs, medicines, or other substances to be used for the cure or alleviation of gonorrhea, syphilis, or chancroid, or shall compound any drugs or medicines for said purpose from any written formula or order not written for the person for whom the drugs or medicines are compounded and not signed by a physician licensed under the laws of the State.

Rule 7. Spread of Venereal Disease Unlawful.

It shall be a violation of these regulations for any infected person knowingly to expose another person to infection with any of the said venereal diseases, or for any person to perform an act which exposes another person to infection with venereal disease.

Rule 8. Prostitution to be Repressed.

Prostitution is hereby declared to be a prolific source of syphilis, gonorrhea, and chancroid, and the repression of prostitution is declared to be a public health measure. All local and state health officers are, therefore, directed to coöperate with the proper officials whose duty it is to enforce laws directed against prostitution, and otherwise to use every proper means for the repression of prostitution.

Rule 9. Giving Certificates of Freedom from Venereal Diseases Prohibited.

Physicians, health officers, and all other persons are prohibited from issuing certificates of freedom from venereal disease, provided this rule shall not prevent the issuance of necessary statements of freedom from infectious diseases written in such form, or given under such safeguards, that their use in solicitation for sexual intercourse would be impossible.

Rule 10. Records to be Secret.

All information and reports concerning persons infected with venereal diseases shall be inaccessible to the public except in so far as publicity may attend the performance of the duties imposed by these regulations and by the laws of the State.

Note 1. A rule providing penalties for violation of these regulations should be added if penalties are not specified by statute. It is thought preferable that the statute should prescribe a penalty for violation of regulations of the State Board of Health. In any case the state law should be examined to make sure that it either prescribes penalties or gives the State Board of Health power to do so. The statutes should also give the State Board of Health the powers suggested by the following wording: "The State Board of Health shall have power to make such regulations concerning venereal diseases, including the reporting thereof and quarantine of infected persons, as it may from time to time deem advisable."

Note 2. It is recommended that provision for intensive treatment in suitable hospitals while patients are under quarantine shall be made by the municipalities, counties, or the State, at public expense, and that adequate hospitals and clinic facilities of high standards shall be made available to voluntary and compulsory patients.

Note 3. For the enforcement of these regulations it is recommended that States establish Bureaus or Divisions of Venereal Diseases under their State Boards of Health and appropriate the necessary funds.

Note 4. The issuance of arsphenamine or equivalents to health officers, institutions, and physicians at state expense, under suitable restrictions, is a valuable measure for preventing syphilis.

Note 5. Provision should be made for the examination of prisoners for venereal diseases and their treatment. If they are still infectious when their prison terms have expired, they should be quarantined and treated until they can be released with safety to public health.

Note 6. Laboratory tests for syphilis and gonorrhea should be made for physicians by the laboratories of the State Board of Health and the health departments of large cities.

Note 7. Due provision should be made for follow-up work and social service in connection with the prevention of venereal diseases.

Note 8. Institutions are needed for the segregation of persons who are, or are almost certain to become, venereal disease carriers and who cannot be adequately controlled in any other way.

SOCIETY NOTICE.

MASSACHUSETTS SOCIETY OF EXAMINING PHYSICIANS.—Meeting April 26, 1918, Copley Plaza Hotel.

1. Dr. Charles H. Lawrence of the Robert Brigham Hospital, "Methods of Heart Examination and Their Values."
2. Dudley Holman, of the United States Mutual Life Insurance Co., "Conservation of Man Power by Accident Prevention."

Dinner at 6.30 p.m. Meeting at 8 p.m.

JAMES H. STEVENS, M.D., *Secretary.*

MUNICIPAL CIVIL SERVICE COMMISSION, NEW YORK.

The Municipal Civil Service Commission has announced three important medical examinations for which applications will be received at room 1400, Municipal Building, Manhattan. Applicants must be citizens of the United States and residents of the State of New York.

Assistant Medical Examiner.—The duties of this position include making investigations of violent and suspicious deaths and to perform autopsies in connection with such investigations. Candidates must be licensed to practice medicine in the State of New York; must also produce evidence of having performed, in an official capacity, two years' work in a pathological laboratory of a recognized school, hospital, asylum or public morgue; and of having performed autopsies. The examination will consist of the following subjects: Experience, 4; written paper, 3, practical test, 3. There are two vacancies in the office of the Chief Medical Examiner of the City of New York. Applicants must be at least 25 years of age. The position pays a salary of $3000 per year. Applications received until May 1, 1918, at 4 P.M.

Deputy Medical Superintendent, Grades 3 and 4.—The duties are to perform such details of supervisory work in the management and control of a large hospital or a group of hospitals as may be assigned by the Medical Superintendent, or to act as Superintendent of a small hospital. Requirements: Candidates must be licensed to practice medicine in the State of New York; they must be graduates of a medical college offering a course of study approved by the New York State Department of Education and have completed an interneship in a hospital of recognized standing, or other equivalent hospital experience. The examination will consist of the following subjects: Experience, 4; technical, 4; oral, 2. There are two vacancies in the Department of Charities, at a salary of $2520 per annum, with maintenance, at Sea View Hospital (exclusively for tuberculosis) and at Cumberland Street Hospital. The salary of Grade 3 is from $1800 to, but not including, $2400; and Grade 4 from $2400 to, but not including, $3000. Applications received at room 1400 until April 29 at 4 P.M.

Pathologist.—The duties are to exercise independent judgment in and to be responsible for pathological examinations and to perform research work under supervision. Requirements: Candidates must be at least 21 years of age and possess a medical degree granted on the completion of a standard course of instruction in a medical school of recognized standing.

CENSORS' EXAMINATIONS.

The Censors of the Suffolk District Medical Society will meet to examine candidates for admission to The Massachusetts Medical Society, at 8 The Fenway, on Thursday, May 2, 1918, at 4 P.M.

Candidates, who must be residents of the Suffolk District or non-residents of Massachusetts, should make personal application to the Secretary and *present their medical diplomas*, at least one week before the examination.

For further particulars, apply from 2 to 5 P.M. to 99 Commonwealth Avenue. GILBERT SMITH, *Secretary.*

The Censors of the Worcester District Medical Society will meet for examination of candidates for fellowship, Thursday, May 2, 1918, at 4 P.M., in the Reference Department, Worcester Public Library. Candidates should make application to the undersigned a week before that date.

ERNEST L. HUNT, *Secretary.*

The Censors of the Essex South District will meet at the new Salem Hospital Thursday, May 2, 3.30 p.m., for the examination of candidates for admission to the Society. All members throughout the District are requested to bring this notice to the attention of non-members, who can obtain further information from the secretary.

H. P. BENNETT, M.D., *Secretary.*